Mergers and Acquisitions: Takeover Efficiency, Social Connection and Acquisition Performance

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Mergers and Acquisitions: Takeover Efficiency, Social Connection and Acquisition Performance

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Material Abstract

Title: Mergers and Acquisitions: Takeover Efficiency, Social Connection and Acquisition Performance

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This thesis develops a composite index to evaluate takeover efficiency and deal quality, and then examines the impact of social connection on takeover process and acquisition performance with U.S mergers and acquisitions (M&A).

Initially, Chapter 2 constructs a composite indicator ("M&A index") to measure takeover efficiency and evaluate the overall deal quality based on stochastic frontier analysis. The M&A index is computed for each takeover transaction and standardised between 0 and 1. Deals with a higher M&A index imply higher takeover efficiency. The empirical results show that the M&A index is significantly and positively associated with the probability of deal completion and post-acquisition performance in the short run and even in the long run, indicating that the M&A index is effective and forward-looking indicator.

Then Chapter 3 examines social connections between bidders and targets and its impact on acquisition premium. Consequently, acquirers, who are closely connected with targets, pay significantly lower premium and tend to use stock as the method of payment. The findings indicate that social connection enhances information transfer and reduces information asymmetry between connected firms. Therefore, acquirers with social connections have better access to target information and enhanced bargaining power in negotiations.

Finally, Chapter 4 addresses the connection between acquirers and their M&A advisors. Investment banks are further classified into full-service advisors and boutique advisors. Consequently, it is found that acquirers are more likely to hire closely connected boutique advisors, especially domestic boutique advisors, in takeover deals while connections between bidding firms and full-service advisors reduces the probability of full-service banks being appointed. Moreover, boutique advisors, who have strong social linkage with bidders, serve the interests of bidders, negotiate lower acquisition premiums and deliver higher deal quality. In contrast, full-service banks act against the interests of the connected acquirers, leading to higher premiums paid and inferior long-run acquisition performance.

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Declaration

This thesis has not been submitted for any other degree or qualification in this or any other university, except for Chapter 3 social connections, reference points and acquisition premium. Part of Chapter 3 is joint research and submitted by Nicolas Cisternas Seeger for a master's degree in this university. The rest of this thesis is my own work unless referenced in the text.

Statement of Copyright

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To my beloved parents & husband

Chapter 1: Introduction

Mergers and acquisitions (M&A) have grown to reach an unprecedented level in recent decades. In the US, there have been 300,000 takeover deals totalling $320,000 billion since 1985. As milestones in corporate development, M&A have a profound influence on firms' financial, operational and stock performance, and therefore attract considerable academic interest (e.g. (S. Chang, 1998; Dong, Hirshleifer, Richardson, & Teoh, 2006; Lang, Stulz, & Walkling, 1989; Loughran & Vijh, 1997; Moeller, Schlingemann, & Stulz, 2004, 2007; Myers & Majluf, 1984; Schwert, 2000; Servaes, 1991; Travlos, 1987) etc.).

Previous M&A literature has devoted significant attention to takeover outcomes and the determinants of acquisition performance. However, the existing literature is mostly concerned with partial takeover issues with no attention given to the overall evaluation of takeover activities. Additionally, in most M&A studies, the determinants of acquisition performance are confined to the deal characteristics and firm characteristics of merger parties (such as Tobin's q and profitability). This thesis provides a new perspective to re-examine takeover quality and investigates the role of social connection in mergers and acquisitions.

1.1 Brief introduction for Chapter 2

Initially, the thesis attempts to create a composite benchmark for M&A to comprehensively evaluate takeover processes and gauge deal quality. The composite index is preferable in aggregating and simplifying information or diverse results, resulting in easy interpretation and comparison for complex processes and therefore easily attracting the public's attention and interest (Sharpe, 2004). Recently,

composite indexes have been increasingly recognised and adopted in corporate finance, such as the KZ index (Almeida, Campello, & Weisbach, 2004; Baker & Savaşoglu, 2002; Kaplan & Zingales, 1997; D. Li, 2011) to measure financial constraints; the Governance Index (Gompers, Ishii, & Metrick, 2003); and the Entrenchment Index (Bebchuk, Cohen, & Ferrell, 2009) to qualify corporate governance (e.g. (Chae, Kim, & Lee, 2009; Dittmar & Mahrt-Smith, 2007; Jiraporn & Gleason, 2007; Masulis, Wang, & Xie, 2007; Villalonga & Amit, 2006). As an important area of corporate finance, M&A studies lack a composite index to quantify takeover activities.

Motivated by this research gap, Chapter 2 introduces the concept of "takeover efficiency" and constructs a composite indicator – the M&A index – to assess overall M&A quality from the acquirers' standpoint. A takeover deal is defined as "efficient" if and only if acquisition attempts could maximise acquirers' gain when announced to the public. Strong-form market efficiency is assumed (Fama, 1965), indicating that the stock price on announcement day incorporates takeover information and fully reflects market responses and expectations regarding acquisition transactions. Higher acquirer announcement return implies that the market is optimistic about a particular takeover deal. The degree of efficiency is measured by comparing acquirers' observed announcement return with the hypothetical maximum return. The deviation from the optimal announcement return is attributed to inefficiency factors in takeover transactions, such as agency problems in bidding firms, overpayment issues, resistance from target management and winners' curse.

To gauge takeover efficiency, Chapter 2 adopts the stochastic frontier analysis (SFA) approach. Specifically, the benchmark M&A index is developed with production

function in stochastic frontier analysis and defined as a ratio of acquirers' actual gain over the optimal and maximum announcement return. The M&A index is assigned for each takeover deal, with a range from 0 to 1. To construct the M&A index, the research includes pre-bid information and the information released on the announcement day as the inputs. Stock movement on announcement day is chosen as the output for the index. A higher M&A index represents a smaller gap between observed return and optimal gain at the announcement, implying that acquiring firms are expected to achieve higher deal quality and more favourable outcomes. Since stochastic frontier analysis requires taking logarithms of variables, the acquisition sample is limited to the deals with positive acquirers' return on announcement day, which relatively outperform the transactions with negative return.

With a sample of 6,254 US public deals announced from 1980 to 2013, the empirical results show that the M&A index could be regarded as a forward-looking indicator for takeover efficiency due to its strong relationship with merger outcomes. Strikingly, the M&A index is positively related to the probability of success and announcement return of acquirers. Acquirers with higher M&A indices pay significantly lower premiums to targets. In addition, M&A index shows a strong and positive relationship with the buy-and-hold return and industry-adjusted return on the asset over the post-acquisition period, indicating that acquirers in more efficient deals achieve better acquisition performance in the long run. Moreover, the research develops the buy-and-hold strategy according to the M&A index. The full takeover deals are split into three portfolios based on the M&A index. Overall, the portfolio with the most-efficient deals (highest indices) significantly outperforms the portfolio with the least-efficient transactions (lowest indices). The most-efficient portfolio (with the highest indices) earns a higher return and monthly alpha than the inefficient

portfolio (least efficient with lowest indices), especially when the holding period is less than six months. Overall, Chapter 1 provides an effective index for measuring takeover efficiency and forecasting post-acquisition performance in the sample with positive acquirer announcement return.

1.2 Brief introduction for Chapter 3

Next, my thesis combines M&A studies with social network theories and explores the role of social connections in takeover activities in Chapter 3 and Chapter 4. Research on social network and its application has become a recent trend and point of interest in corporate finance. A large body of literature shows that social connection through directors' personal network significantly affects firm performance and corporate decisions. The main advantage of inter-firm ties is information advantage. Social connection enhances information-transfer through personal networks and facilitates information-exchange, therefore reducing information asymmetry (Engelberg, Gao, & Parsons, 2012; Mol, 2001; Myers & Majluf, 1984; Schoorman, Bazerman, & Atkin, 1981; Uzzi, 1999; Wasserman & Faust, 1994). Moreover, firms with social connections could save costs and efforts in obtaining and processing information (Myers & Majluf, 1984). In particular, a closer connection between firms is associated with larger information advantage and higher-quality information.

Furthermore, social connection builds trust beyond business cooperation and results in familiarity bias as well as social conformity, therefore affecting investment decisions. Firms are more likely to bring "friends" to the table and select connected firms as business partners. On the one hand, firms with familiar partners may benefit from better access to information about a target's true value. Additionally, "friends"

could take into account the interests of their partners, leading to favourable business outcomes (Cohen, Frazzini, & Malloy, 2008; Cooney, Madureira, Singh, & Yang, 2015; Hochberg, Ljungqvist, & Lu, 2007). On the other hand, firms may overtrust connected organisations, miss out on better opportunities and ignore more appropriate business partners, resulting in agency problems and worse firm performance (Ishii & Xuan, 2014).

The growing literature addresses social connections between acquirers and targets and finds mixed results of the social connection effect (Cai & Sevilir, 2012; Ishii & Xuan, 2014; Renneboog & Zhao, 2014). Motivated by the conflicting results in the previous literature, Chapter 3 of this thesis provides further evidence of the impact of bidder-target connection on M&A. This research manually checks board connections in the BoardEx database and classifies social connections into first-degree and second-degree connections. A first-degree connection refers to acquiring firms and target firms sharing the same board directors or executives before takeover announcement. A second-degree connection is defined as two individuals, respectively from the acquirer and target firm, having the same educational background and employment history as well as other experiences (such as government background, joining in the same club).

Chapter 3 focuses on the impact of social connection on acquisition premium. Among the takeover outcomes, acquisition premium is directly affected by social connection, and could best reflect the bargaining power between acquirers and targets. Therefore, premium analysis could better verify the information hypothesis in the social network theory. Furthermore, this study introduces another psychological standpoint in the form of the reference point theory (Baker, Pan, &

Wurgler, 2012) to test which factors determine the target valuation and offer premium in the bidding process. According to Baker et al. (2012), target 52-week high is the psychological reference point for both acquirers and targets when pricing target firms and negotiating acquisition premiums. Merger parties would adjust the target valuation by anchoring the target 52-week high. The previous literature confirms the strong and positive relation between target 52-week high and premium (Alexandridis, Fuller, Terhaar, & Travlos, 2013; Baker et al., 2012; Betton, Eckbo, Thompson, & Thorburn, 2014). Chapter 3 examines whether information advantage or reference points play the determining role in premiums.

With 1,072 US takeover deals over the period from 2001 to 2012, Chapter 3 illustrates that social connection reduces the acquisition premium by 5.54% on average. Especially, acquirers pay 25.59% less premium for targets in deals involving a first-degree connection than non-connected M&A transactions. However, the target 52-week high reference point is 2.40% higher in first-degree connected deals than in non-connected ones. Based on the reference point theory, a higher target 52-week high reference point is related to a higher premium. Therefore, the deals in the first-degree connected deals (with higher target 52-week high) should be related to higher premiums. However, first-degree connected deals show a significantly lower premium regardless of the level of the reference point, which is confirmed and verified by both univariate and multivariate analysis. The findings in the thesis imply that connected firms ignore psychological reference points in target valuations. Social connection determines offer premium by reducing information asymmetry and increasing acquirers' negotiating power. In addition, the thesis adopts an alternative proxy – CEO connection – and further confirms that premium is mainly affected by information advantage rather than psychological reference.

Moreover, connected deals are more likely to take place when acquirers have a relatively higher stock valuation and are more likely to be financed using the acquirers' stocks, indicating that connected acquirers have stronger bargaining power and could persuade targets to accept the less-favourable deal items.

Furthermore, the research explores the reasons why acquirer-target connection favours acquiring firms and why target firms accept a lower premium. The findings show that connected directors may act in the interest of acquiring firms attributed to either a higher level of positions in acquirers or self-interest. In first-degree connected deals, all the interlocking directors who serve in both the acquirer and the target remain on the board of the newly merged firms. In 90.25% of M&A transactions with first-degree connections, overlapping directors are appointed to positions in acquirers at a higher level than,[1] or equivalent level to, their positions in targets. These interlocking directors who are offered higher positions in the acquirers receive more benefit and therefore give priority to acquiring firms at the cost of targets' interest, resulting in significantly lower premiums (on average 11.49%). Moreover, acquirers generally have a larger firm size than the targets and can provide directors with more benefits and opportunities such as information, social network, and appointments from other outside firms (Ferris, Jagannathan, & Pritchard, 2003). In second-degree connected deals, connected directors have a higher probability of being retained in the newly merged firms. Moreover, the board seats of the combined firm certify the quality of the directors and bring both financial and non-financial benefits to connected board members (H. Wang, Sakr, Ning, & Davidson, 2010). Therefore, target connected directors or executives have a strong

[1] Higher-level position refers to the situation where interlocking directors are appointed as the CEO or chairman in the bidding firm while hired as an independent or ordinary board director of the target.

incentive to accept a low premium and promote deal completion by sacrificing the interests of the target shareholders.

1.3 Brief introduction for Chapter 4

Finally, Chapter 4 investigates the connection between acquirers and investment banks and its impact on the advisor-selection process and on acquisition performance. Similar to the classifications in Chapter 3, social connection in Chapter 4 is divided into first-degree connection and second-degree connection[2]. Furthermore, the research classifies M&A advisors into full-service investment banks and boutique investment banks[3] and examines whether the influence of acquirer-banking connection varies in deals advised by different types of investment banks.

Using a sample of 1,565 US takeover deals from 2005 to 2016, Chapter 4 shows that acquiring firms are more likely to hire boutique banks, especially domestic boutique banks, who have first-degree connections with them, as their M&A advisors. When acquirers share board directors with domestic boutique advisors (first-degree connection), the probability of domestic boutique banks being selected is 4.87 times greater than the probability of not being chosen, implying that a close connection through a personal network helps boutique advisors to obtain business. Acquirers are willing to hire closely connected domestic boutique banks as M&A advisors. However, the social connection between acquirers and full-service banks reduces the

[2] First-degree connection refers to the situation where the board directors of acquiring firms concurrently sit on the board of investment banks, while a second-degree connection is defined as two individual directors, respectively from the acquirers and the advisors, serving on the board of the third firm.

[3] Consistent with Song et al. (2013), a full-service advisor refers to an investment banker who engages in full-line financial services including trading, underwriting, M&A advisory, security and debt services, etc. Boutique advisors are non-full-service advisors, providing expertise in certain industries (technology, healthcare, etc.) or corporate finance (mergers and acquisition, restructuring, etc.).

likelihood of being chosen since most of the overlapping directors are recruited as independent directors in bidding firms or/and full-service investment banks. Additionally, acquirers may recognise that hiring connected full-service banks raises the issue of agency conflicts.

Furthermore, in deals advised by boutique advisors, acquirers who have a first-degree connection with boutique banks pay a significantly lower premium than firms than those with no connection, suggesting that boutique advisors with social ties serve the interests of acquiring firms and negotiate lower premiums for firm clients. In contrast, social connections with full-service banks increase the acquisition premium paid to targets, indicating that acquirers hiring connected full-service advisors suffer more agency problems. In the short run, acquirers' announcement returns are not affected by social connections with M&A advisors in deals involving boutique banks or full-service advisors. In the long run, first-degree connections with boutique advisors exert a positive impact on post-acquisition stock and operating performance. Specifically, a closer relationship with boutique banks is positively associated with acquirers' stock return when holding for three months, six months and nine months following takeover announcement. Moreover, first-degree connected boutique advisors increase acquirers' industry-adjusted return on assets as well as cash flow performance for the fiscal year post-takeover. However, the research shows a strong and negative relationship between first-degree connection and acquirers' buy-and-hold return in the deals advised by full-service investment banks. Combing the premium analysis and findings for short-run performance, the empirical results provide evidence that closely connected boutique advisors serve in the interests of acquiring firms and deliver better deals while full-service banks with social connections act against the interest of acquirers and generate more agency

conflicts, therefore leading to less favourable takeover outcomes.

1.4 Contribution and implication

Overall, this thesis provides a new perspective to revisit takeover outcomes and the determinants of acquisition performance from the standpoint of acquirers. The research develops an effective and forward-looking indicator and illustrates that more efficient deals are expected to have better acquisition performance. Moreover, it shows that social connections matter in takeover deals and affect acquisition performance through changes in agency conflicts.

This thesis has contributed to the current M&A literature in several aspects. First, the research creates an effective and forward-looking index for mergers and acquisitions. To the best of the author's knowledge, Chapter 2 is the first to develop a composite indicator to measure the degree of efficiency of takeover transactions and to evaluate deal quality with a comprehensive perspective. As the KZ index measures in studies of financial constraint, the M&A index simplifies the complicated takeover process and facilitates the analysis and interpretation of M&A activities in both practice and academic research.

Second, Chapter 2 introduces stochastic frontier analysis (SFA) to M&A research. The SFA methodology is applied to measure the efficiency change of banks during pre- and post-acquisition periods. This study expands this approach to the whole field of M&As studies. Moreover, current SFA research focuses on the degree of efficiency of firms and the impact of events on firms' efficiency. Few studies have utilised the SFA approach to study and analyse events. The M&A index is an efficiency measurement to evaluate acquisitions, which enriches the application of

SFA to event studies.

Third, this research contributes to the existing body of literature by also incorporating social network theory. Chapter 3 investigates the social ties between bidding firms and target firms and provides evidence of the information advantage of social connections. Unlike previous studies that have combined social network and M&A studies, Chapter 3 emphasises the effect of acquirer-target connection on acquisition premium, and compares the influence of social connections on a psychological reference point (Baker et al., 2012) in the negotiation process. Complementary to previous studies, Chapter 3 provides support for the information advantage hypothesis[4] and explains why social connection favour acquirers and why targets in connected deals accept less favourable deal outcomes. In the previous literature on M&A, the firm-banking relationship is generally developed through previous business, such as IPO issuance, debt issuance or previous takeover transactions. Connection through personal networks has not been explored. Social network increases information exchange and sense of trust beyond individual transactions, therefore leading to a larger impact than previous business linkages in corporate decisions and M&A performance. Moreover, to the author's best knowledge, Chapter 4 is the first to explore the social connection between acquirers and their M&A advisors.

Chapter 4 also contributes to the current literature by analysing the difference between full-service investment banks and boutique investment banks. Recently, boutique advisors have attracted considerable interest from firm clients and have

[4] The information advantage hypothesis indicates that social connection could facilitate the information exchange and reduce information asymmetry between connected firms.

grabbed a good deal of market share from full-service banks, especially following the 2007 financial crisis. However, few academics have devoted much attention to boutique investment banks. Chapter 4 fills this gap and re-examines the difference between full-service banks and boutique advisors from the standpoint of acquirer-banking connection. The findings show that the effects of acquirer-banking connections are affected by types of investment banks.

Fourth, this thesis has important implications for academic research and practitioners. In Chapter 2, the empirical evidence shows that the M&A index can evaluate takeover quality and effectively forecast long-run post-acquisition performance. Similar to existing composite indices (such as the KZ index, entrenchment index, and governance index) in corporate finance, the M&A index could be incorporated into financial models to measure the effect of acquisition on firm performance or business activities. Moreover, investors could design trading strategies based on the M&A index. Chapter 2 develops a buy-and-holding strategy based on the M&A index and confirms that holding portfolios with the highest M&A indices is profitable during post-acquisition periods. In addition, Chapters 3 and 4 have implications on corporate governance for acquisition partners. Chapter 3 suggests that acquirers benefit more from social connections with targets while target management may accept inferior deal items due to their personal interests. Therefore, acquirers who initiate acquisition attempts could consider connected firms as target candidates while target shareholders in connected deals should take extra care in their negotiations with acquirers. Furthermore, Chapter 4 implies that closely connected boutique advisors serve the interests of acquiring firms while full-service banks who are socially tied with acquirers act against the interest of clients. Acquirers could benefit from using their boutique advisor friends and therefore

achieve better deal outcomes. Moreover, hiring connected full-service investment banks increases agency conflicts between acquirers and advisors, resulting in inferior deals for acquirers. Therefore, acquirers should try to avoid appointing full-service investment banks as their M&A advisors.

The remainder of the thesis is structured as follows. Chapter 2 creates a composite benchmark (M&A index) to measure takeover efficiency and re-evaluate the overall quality of M&A transactions. Chapter 3 focuses on the impact of acquirer-target connections on acquisition premiums and examines the effects of social connections on psychological reference points (target 52-week high (Baker et al., 2012) when it comes to pricing M&A targets and negotiations. Chapter 4 investigates the social connections between acquiring firms and their M&A advisors and examines the impact of firm-banking connections on takeover outcomes in deals advised by full-service investment banks or boutique advisors. Chapter 5 concludes the thesis and discusses the implications and limitations involved herein, and also sets out areas for future research.

Chapter 2: Indexing Mergers and Acquisitions

2.1 Introduction

This chapter introduces the first composite index (M&A index) for mergers and acquisitions to measure takeover efficiency and evaluate deal quality from the standpoint of acquiring firms. Specifically, chapter 2 investigates whether acquirers efficiently takeover targets, and whether the efficiency of acquisitions (measured by the M&A index) forecasts post-acquisition performance in both the short run and the long run. Furthermore, this chapter develops a trading strategy based on the M&A index.

The existing M&A literature devotes considerable attention to merger outcomes (e.g.(S. Chang, 1998; Dong et al., 2006; Lang et al., 1989; Loughran & Vijh, 1997; Moeller et al., 2004; Myers & Majluf, 1984; Schwert, 2000; Servaes, 1991; Travlos, 1987) and their determinants (mostly firm and deal characteristics). Merger outcomes are multidimensional, including probability of deal completion, bid premium, stock performance during announcement period or post-acquisition long-run performance. Previous literature has segregated takeover processes and investigated partial acquisition outcomes. In addition, these M&A studies have generally emphasised the effect of single or multiple factors of deal characteristics and corporate fundamentals. Moreover, the impact of each determinant on acquisition performance is affected or biased when different variables are controlled. For example, Tobin's Q, defined as firms' market value over the book value of their equity (M/B), is positively related with acquirer return (Lang et al., 1989; Servaes, 1991). In contrast, Dong et al. (2006) employ the reverse B/M as q ratio and find that

bidders with a high q (B/M) earn positive returns. Another example is hostility. Servaes (1991) indicates that acquirers involved in hostile bids earn less while Schwert (2000) finds that bidder return is unaffected by takeover attitude. The uncertain or controversial relationship between determinants and takeover outcomes is attributed to the complication of takeover processes and the lack of overall evaluations of M&A activities. Motivated by this research gap, this chapter redefines the concept of takeover efficiency[5] and develops a composite index, the M&A index, in order to provide a comprehensive understanding of takeover quality.[6]

The composite index is widely applied to research analysis in macro-economics and I used to determine metrics such as Gross Domestic Product (GDP), Genuine Progress Indicator (GPI), and Human Development Index (HDI). Sharpe (2004) indicates that the composite index has a great advantage in consolidating information from a complex process and standardising diverse empirical results. Indexing economic behaviour facilitates the interpretation and comparison of complicated issues, and therefore attracts more and more public attention and interest.

In the field of corporate finance, composite indicators are increasingly recognised and adopted. For example, the KZ Index was constructed to measure financial situations by (Kaplan & Zingales, 1997) and is widely applied to analyse cash flow sensitivity (Almeida et al., 2004), investment (Baker, Stein, & Wurgler, 2003) and R&D investment (D. Li, 2011). Another example is the Governance Index (Gompers et al., 2003) and the Entrenchment Index (Bebchuk et al., 2009) to evaluate corporate

[5] "Efficiency" in recent M&A studies refers to the "efficiency gain" – acquirers'/ targets' announcement returns show whether an acquisition partner earns an abnormal return during the announcement period. In this paper, however, efficiency is related to the whole takeover process and is used to measure overall acquisition quality.

[6] Tehranian, Zhao, and Zhu (2013) illustrate that high-quality acquisitions are deals where bidding firms earn a higher announcement return, pay a lower premium and enjoy a higher trading volume.

governance. Gompers et al. (2003) create a “Governance Index” to measure how much rights shareholders gain in companies. A higher “Governance Index” implies a higher level of shareholder interest, less agency problem and better stock performance. Bebchuk et al. (2009) constructed the “Entrenchment Index” by including more governance provisions. The presence of the “Governance Index” and “Entrenchment Index” makes it easier to incorporate the quality of corporate governance into studies (e.g. (Dittmar & Mahrt-Smith, 2007; Jiraporn & Gleason, 2007; Masulis et al., 2007; Villalonga & Amit, 2006).

Both a company’s financial situation and its corporate governance are subjective, abstract and multi-dimensional elements. Previously, scholars have investigated these two issues generally using a basket of various financial ratios and descriptions. The development of composite index quantifies and simplifies abstract topics, making it easier to capture the general situation and analyse the determinants. Therefore, constructing a standardised and meaningful index has implications in academic research. The composite indicator could measure finance issues quantitatively so as to be investigated in econometric models as a variable.

However, M&A, as one of the largest corporate investments possible, tends to exert strong and long-lasting influence on firms’ operating and financial performance. Takeover outcomes are the overall results of various firm characteristics and deal characteristics. However, previous M&A studies lack comprehensive evaluations of takeover activities, and have mainly focused on the relationship between merger outcomes and single or multiple determinants. Hence, a composite benchmark, which could accurately measure overall takeover quality, is necessary to re-evaluate and forecast acquisition performance effectively. To the best of this author’s

knowledge, this chapter is the first to fill the research gap and hence enrich the M&A literature.

To index mergers and acquisitions, this chapter introduces the concept of "takeover efficiency" to assess overall takeover quality[7] from the perspective of acquiring firms. A takeover deal is regarded as being "efficient" if and only if the acquisition attempt could maximise the acquirer's stock return[8] when it is announced to the public. Strong-form efficiency (Fama, 1965) is assumed, suggesting that the stock movement on the announcement day could fully reflect the market reaction and expectations regarding the takeover transaction. A higher announcement return signifies that the market is more optimistic towards the deal. The M&A index is designed to gauge the degree of efficiency for each takeover transaction and is constructed as a ratio of the acquirers' observed announcement returns with the hypothetically maximum gain on announcement day.

Ideally, acquiring firms could achieve the optimal announcement return in each takeover transaction as acquisition per se is an efficient strategy for firms to develop and expand their business. There is a growing body of literature showing that takeover transactions could benefit acquirers with synergy gains, including financial and operational improvements (Devos, Kadapakkam, & Krishnamurthy, 2009; Hoberg & Phillips, 2010; Houston, James, & Ryngaert, 2001). Therefore, bidding firms should receive a good and positive response from the market. The

[7] Tehranian et al. (2013) illustrate that acquisition with high quality is a deal when bidding firms earn a higher announcement return, pay a lower premium and enjoy a higher trading volume. Herein, we adjust the standards for good quality acquisitions and relate the deal quality with takeover efficiency.

[8] The M&A index is constructed with acquirers' stock performance rather than combined firms' stocks because acquirers generally have much larger firm-size than targets. The value-weighted announcement returns for combined firms are heavily affected by the acquirer's stock performance on the announcement day. Moreover, the post-acquisition performance in the long run is mainly determined by bidding firms since acquirers take control of targets.

announcement return in ideal acquisitions is the optimal and maximised return of acquirers. In practice, however, the observed announcement return is less than the optimal gain, resulting from the existence of various takeover inefficiencies. For example, merger outcomes are negatively affected by agency problems in acquirers and resistance from target management etc.[9] The gap between the actual and optimal announcement returns could be estimated with the efficiency degree of each takeover transaction. Higher takeover efficiency indicates that the actual acquirers' return is closer to the optimal market reaction, implying that acquirers are involved with higher quality deals and are expected to gain better post-acquisition performance. Accordingly, this chapter constructs the M&A index[10] to score the efficiency degree for each takeover deal quantitatively. By design, the M&A index is expected to predict merger outcomes, including the probability of deal completion, announcement return in the short run and long-run post-acquisition operating performance.

Specifically, the M&A index is developed using the stochastic frontier analysis (SFA) approach.[11] SFA is a parametric approach used to measure firms' efficiency, which refers to their ability to maximise their profit given a set of inputs or minimise their costs given a set of outputs with technic stable. Most studies adopt the SFA approach to measure the efficiency of firm performance. A few studies have developed SFA in event analysis, such as IPO underpricing (Hunt-McCool et al., 1996; Koop & Li,

[9] Take an analogy: pasta is delicious and can be scored at 10 (optimal). The score of pasta will be lower, say 7, if too much salt is added or if the pasta is overcooked. "Pasta" the dish is a takeover. "Too much salt" and "overly boiled" is the inefficiency.

[10] In the subsample with the entrenchment index (Bebchuk et al., 2009), the findings show that the M&A index is negatively related with the entrenchment index (agency cost problem) and the premium paid by the acquirer (overpayment), indicating that the acquirer agency problem and overpayment reduces the M&A index. The choice of a cash payment increases the M&A index. The findings indicate that the M&A index could reflect and capture the takeover efficiency.

[11] See Aigner, Lovell, and Schmidt (1977); Meeusen and van Den Broeck (1977).

2001) and the managerial problem (Habib & Ljungqvist, 2005). In this chapter, the SFA is implemented to measure the deviation from the optimal market reaction to acquirers' takeover announcements. The acquirer's announcement return is employed as an output of SFA to quantify the market attitude towards the takeover deal. Market optimism would be reflected in a high announcement return for acquirers and would imply better deal quality. The inputs of the M&A index include the pre-bid characteristics of acquisition partners (bidders and targets), and the information revealed on the announcement day. Due to data availability, the chapter only considers public acquisitions in which both acquirers and targets are public-listed firms. Strong-form market efficiency is assumed, so that all public and private information regarding the deal is realised in the stock price on the announcement day.

In essence, the M&A index is the technical efficiency[12] of stochastic frontier models, calculated as the actual acquirer's return divided by the optimal return on the announcement day. The optimal announcement return represents the maximum feasible announcement return that a bidding firm could reach without inefficiency factors in the transaction. The M&A index is assigned to each takeover deal and standardised between 0 and 1.[13] The higher M&A index indicates the smaller deviation from optimal announcement returns and implies a better deal quality.

This chapter adopts a full sample of 6,254 US public acquisitions over the period

[12] Technical efficiency in SFA is measured as firm's actual output over maximum output value.

[13] Stochastic frontier analysis assumes that optimal output is the maximum value that a firm could realize. The actual output is less than optimal output. The technical efficiency $\frac{actual\ output}{optiamal\ output}$ is therefore less than 1. This chapter assumes that acquirers 'optimal announcement return is larger than their actual announcement return. Therefore, the M&A index which equals to$\frac{acquirers' actual\ announcement\ return}{acquirers' optiamal\ announcement\ return}$, is limited to 1.

1980 to 2013. On average, the M&A index for the full sample is 0.9795. The lowest index is 0.6928 while the highest is 0.9969, almost close to 1. The general high index could be explained by the deals selected in the sample. Due to the restriction of SFA, the acquisition sample in this chapter is limited to deals with positive acquirers' return on announcement day. In addition, the higher index is attributed to the public deals, implying that the market is efficient to reflect the influence of takeovers on acquirers. Compared to the transactions with private targets, acquiring firms in public deals can better acknowledge the target information, therefore valuing targets and evaluating takeovers more reasonably. Additionally, the market can evaluate and respond to public takeovers more efficiently as listed firms disclose more firm information to the public. Due to the efficient market, the actual investors' response approaches the optimal abnormal return that bidders should have on the announcement day.

Moreover, empirical results show that the M&A index could effectively measure takeover efficiency and forecast post-acquisition performance. The M&A index is positively and significantly associated with the probability of deal completion, indicating that deals with higher indices are more likely to be successfully consummated. Moreover, a 1% increase in the M&A index leads to a 7.37% decrease in offer premium with explanatory variables and fixed effects controlled, indicating that acquirers in more efficient deals pay a lower acquisition premium to the targets. In this study, short-run performance is measured by the cumulative abnormal returns (CARs) calculated with the market model (Brown & Warner, 1985), over the period from 3 days to 5 days after the announcement (ACAR (+3, +5). As a consequence, acquirers in high-efficiency deals earn 0.1145% more than acquirers in low-efficiency transactions. Moreover, the M&A index shows a strong and positive

relationship with stock performance one year following acquisition, implying that the M&A index demonstrates predictability of post-acquisition stock performance in the medium run. Additionally, the M&A index shows a positive and strong relationship with long-run post-takeover operating performance, estimated as an "Industry-Adjusted Return on Asset" (Healy, Palepu, & Ruback, 1992) for acquirers. In all, the M&A index is an effective indicator to measure and forecast merger outcomes in the sample of deals with positive acquirers' announcement return, including success rate, offer premium and post-acquisition performance.

Finally, this chapter develops a buy-and-hold trading strategy based on the M&A index over the post-acquisition period. Specifically, all sample deals are divided into three different portfolios based on the M&A index: Portfolio 1 with the least efficient deals (lowest M&A indices); Portfolio 2 with deals of moderate efficiency; and Portfolio 3 with the most efficient deals (highest M&A indices). The findings show that, in the acquisition sample, acquirers in the most efficient deals (Portfolio 3 has the highest quantile of the M&A index) significantly outperform firms bidding in the least efficient deals (Portfolio 1 lowest quantile of the M&A index) in monthly holding returns and monthly alphas. This superior performance of Portfolio 3 is robust when applying different asset pricing models, including the CAPM model, the Fama-French three-factor model, the Fama-French four-factor model and the Fama-French five-factor model. On average, the portfolio with the most efficient deals (Portfolio 3) earns a 7% higher monthly return than the portfolio with the least efficient transactions (Portfolio 1) for one-month to six-month holding periods after acquisition. Especially, the monthly alpha of Portfolio 3 is also 9.08% higher than the monthly alpha of Portfolio1 when holding one month.

To the best of the author's knowledge, this chapter is the first to develop a composite index to measure the efficiency of takeovers and forecast merger outcomes. The M&A index has implications for both practitioners and academics alike. Financial practitioners can evaluate and forecast acquisition performance in a simpler way. In addition, researchers can use the M&A index to measure the impact of acquisitions in asset-pricing models or the field of corporate finance.

This study contributes to the current studies in several ways: firstly, this chapter creates a comprehensive indicator – the M&A index – to evaluate the takeover quality of bidders. It also re-evaluates the acquisition consequences from a bird's eye view and re-examines the determinants of acquisition outcomes by capturing all ex ante deal information. More importantly, the complicated acquisition process is quantified with representative numbers. Similar to the KZ index, or the Governance index, the M&A index simplifies the interpretation of takeover activities and facilitates comparison with competitors in the same industry and even the whole market.

Secondly, this study contributes to financial studies by providing an alternative indicator for market reactions to acquisition announcements. Luo (2005) indicates that bidders' management learn from market reaction to the takeover bid and decide whether to complete the deal or not. Currently, stock movements are the main proxy for market reactions to acquisition transactions. The M&A index is an efficiency ratio of the actual market reaction compared to what the market response should be when inefficiency factors (such as overpayment) do not exist. Lower indices mean a larger gap between actual and ideal stock reaction, indicating that outsiders look down on an acquisition more. Therefore, the M&A index could be an efficient

indictor for investors to learn market reactions.

Thirdly, this study provides a new reference for a trading strategy based on the mergers and acquisitions. The M&A index could be regarded as a tool for investment selection. A higher M&A index signifies a more efficient deal. Investors could take long positions on efficient deals or short inefficient takeovers at the same time to earn a positive acquirer's return over the holding period within six months of an acquisition being announced to the public. Furthermore, being linked to strong and positive relationships with deal success rates, the M&A index could be a supplementary indicator of merger arbitrage, reducing possible losses due to deal completion risk.

The fourth contribution of this chapter is its introduction of stochastic frontier analysis (SFA) to M&A research. SFA has only been used to measure the efficiency change of banks during pre- and post-acquisition periods. This study expands this approach to the whole of M&A studies. Moreover, current SFA research focuses on the efficiency degree of firms and the impact of events on firm efficiency. Few studies have utilised the SFA approach. This chapter creates M&A index as an efficiency measurement to evaluate acquisitions and enriches the application of SFA into event studies.

The chapter is structured as follows: Section 2 reviews the literature; Section 3 presents our hypothesis; Section 4 describes the methodology and variables used to construct the M&A index; Section 5 shows the descriptive data and the M&A indices; Section 6 reports the empirical results of the study; and Section 7 provides a conclusion.

2.2 Literature review

2.2.1 Stochastic frontier analysis

Stochastic frontier analysis (SFA) is introduced to calculate the M&A index. The stochastic frontier model was first proposed by Aigner et al. (1977) and Meeusen and van Den Broeck (1977) as a production function in econometrics. Traditional literature on the SFA presumes that all firms could reach their maximum output and lie on the efficient frontier with fixed technology. Aigner et al. (1977) develop the previous studies by suggesting that the error component in the production function could be decomposed as two parts – random error and the gap from the theoretical value estimated by the model. The deviation with half-normal distribution represents the inefficiency in the production process, which can be controlled and improved by firms. Additionally, Meeusen and van Den Broeck (1977) employ the Cobb-Douglas production function and propose a similar view on the error component. Specifically, the deviation from the optimal value on the frontier could be attributed to human errors. However, unlike Aigner et al. (1977), Meeusen and van Den Broeck (1977) assume the inefficiency component to be exponentially distributed. Stevenson (1980) shed light on the stochastic frontier function by assuming the inefficiency term as truncated normal-distributed. Additionally, Greene (1990) introduced the stochastic frontier model with a gamma-distributed inefficiency term. Moreover, all of these studies opted for the maximum likelihood method to estimate the frontier model.

Jondrow, Lovell, Materov, and Schmidt (1982) contributed to the field of the stochastic frontier model by separating idiosyncratic error from firm effect (inefficiency), therefore making it possible to predict the technical efficiency for each producer. The production function with cross-sectional data is applied in the

paper. This research adopts half-normal and exponential distribution for the inefficiency component and estimates the technical efficiency as the expected value of inefficiency conditional on the total error of production function. Based on the estimation method, subsequent studies have explored the calculation of technical efficiency using different samples and models.

Schmidt and Sickles (1984) develops individual firm effect (efficiency) research by substituting the cross-sectional data in Jondrow et al. (1982) with panel data. Panel data is superior to cross-section sampling in three respects. First, technical efficiency for individual firm can be consistently estimated. Second, the distribution assumption for the inefficiency part can be neglected. Third, the researcher can relax the condition that inefficiency is uncorrelated with independent variables.

Battese and Coelli (1988) expand Jondrow et al. (1982) and further develop the estimation method on technical efficiency for individual firms. The inefficiency component is assumed to be truncated distribution, which generalises firm effects. Additionally, frontier production for panel data is employed in the paper. The value of technical efficiency, ranging from 0 to 1, can be obtained by dividing the actual production output of each firm by the optimal output without inefficiency. Moreover, an empirical case – the Australian dairy industry – is used to test the stochastic frontier model. The results show that in the sample, the normal-truncated model is superior to the traditional Cobb-Douglas production function estimated by OLS and frontier production with inefficiency as half-normal distributed.

SFA is a parametric approach used to measure firm efficiency, which refers to a firm's ability to maximise its profit given a set of inputs or to minimise its costs given a set of outputs with stable technology. Cummins and Weiss (1999) point out

that the SFA approach enables the comparison between firm performance and its best practice and summarises firm performance in a single meaningful and reliable indicator, which is the advantage of SFA over traditional accounting and financial indicators. For this reason, SFA has been widely applied to empirical research in economic analysis, the banking industry, corporate governance and so forth.

Baik, Chae, Choi, and Farber (2013) adopt both SFA and data envelopment analysis (DEA) to estimate operational efficiency and explore the linkage between efficiency and firm performance. They indicate that firms that take action to improve their operational efficiency perform better in both current and future earnings. Moreover, enhancement in firm efficiency is considered by market in firm evaluation, implying that firms with higher efficiency earn larger stock returns. Improvement in firm operational efficiency also predicts better stock returns in the future, suggesting that the market does not fully incorporate changes in firm efficiency. Additionally, analysts take improvement of operational efficiency into account when adjusting their forecasts.

Habib and Ljungqvist (2005) construct a benchmark with a production function in SFA to analyse the agency problem and managerial incentive. Tobin's Q is used as the measurement for firm value. Essentially, the benchmark is a ratio of actual Tobin's Q to the optimal Tobin's Q for each firm, representing the firm efficiency to achieve best performance. The optimal level can be reached when managers maximise shareholders' value given the firm's opportunity set and fixed characteristics. The discrepancy between actual and ideal firm value is attributed to the agency cost, and specifically managerial incentives. The paper shows that an increase in CEO's stockholdings reduces the disparity with the hypothesised firm

value, and therefore improves firm efficiency. The relationship is stronger when the firm size is smaller. In contrast, larger option-holding leads to larger shortfall from best performance, implying that higher agency cost exists in the firm. Moreover, the *vega* of the options, representing the volatility of option-holding, is smaller for less efficient firms. In other words, this shows if an option is not risk-sensitive enough to stimulate management to maximise shareholders' value.

Nguyen and Swanson (2009) follow the procedure in Habib and Ljungqvist (2005) and employ SFA to develop a benchmark to measure firm efficiency. The market appreciates efficient firms, resulting in high firm valuation (measured by Tobin's Q). Their paper further explores the relationship between firm efficiency and equity returns. The full sample is divided into 10 portfolios based on their efficiency level. A buy-and-hold strategy is applied to each portfolio. The findings indicate that those firms with the highest efficiency underperform the least efficient ones after controlling for size, Tobin's q and momentum. Moreover, the inefficient firms are related to a higher cumulative return when held for five years. The findings could be explained that inefficient firms indeed improve their performance.

Khiari, Karaa, and Omri (2007) adopt SFA and develop a comprehensive index to measure the disparity between firms with the best corporate governance practices. The larger index represents less efficient governance management in firms. Previous studies have focused on the impact of particular governance mechanisms on governance quality and performance. Unlike those studies, however, Khiari et al. (2007) integrate the most common governance mechanisms into a synthetic inefficiency score, including inside control, managerial discretion, and ownership concentration. Firm characteristics are controlled to construct the governance index.

The results show that firms with a high dividend yield, high return on equity and large firm size tend to perform more efficiently in terms of corporate governance. Higher leverage is associated with worse governance quality. However, the sample for the governance index is 230 US firms from Forbes 500, most of which are large. The selection bias limits the application and generalisation of the corporate governance index.

H.-J. Wang (2003) studies the investment of financing-constrained firms in Taiwan using SFA. The paper adjusts the original frontier model by improving two aspects related to the empirical examples in Taiwan. The first improvement is to include both firm and time fixed effects in the production function. The second is to adopt a flexible approach to avoid heteroscedasticity in the inefficiency component. By employing the adjusted model, they create an investment efficiency index ranging from 0 to 1 to represent the efficiency of firm investment. A higher efficiency index implies a more optimal rate of investment for finance-constrained firms. The results show that investment in financially constrained firms can be well modelled using the frontier production function. Moreover, smaller-sized firms in Taiwan can be more efficiently improved through financial liberalisation.

Most papers utilise the SFA approach to measure the efficiency of firm performance. Only a few studies have developed SFA in event analysis, such as IPO underpricing (Hunt-McCool et al., 1996; Koop & Li, 2001) and the managerial problem (Habib & Ljungqvist, 2005). Some previous studies have employed efficiency measures to analyse takeover activity in the banking industry. They have focused on the efficiency changes of bidder and targets in pre- and post- acquisition periods. However, the efficiency concept has not been expanded to other takeover activities.

This chapter fills the gap of application in SFA.

Berger and Humphrey (1992) were the first to introduce cost functions and analyse megamergers in US banking from 1981 to 1989 with direct efficiency measures (X-efficiency). The results show that acquisitions among banks did not successfully improve cost efficiency. The increase in X-efficiency after acquisition was found to be insignificantly less than five percentages points, which can be party explained by diseconomies of scale. DeYoung (1997) re-examined pre-and post-merger X-efficiency with a sample of US mergers from 1987 to 1988 using a thick cost frontier methodology. The paper posits that 58% of acquisitions improve the efficiency of combined firms. However, this finding is inconsistent with the relative efficiency hypothesis, which indicates that efficiency gains can be predicated in takeovers between high-efficient acquirers and low-efficient targets. Additionally, acquisitions are more likely to generate efficiency gains for acquirers with more experience in takeover activities. Akhavein, Berger, and Humphrey (1997) contributed to the efficiency and profitability gain in banking-merger research by studying profit efficiency and market power. The paper obtains the same megamerger sample from 1981 to 1989 and determines the three sources of profitability gains – improvement in cost efficiency, enhancement in profit efficiency, and rise in market power. The authors find that profit efficiency is significantly improved in US bank megamergers on average, yet there is a small and insignificant increase in market power, which is reflected in price changes. Al‐Sharkas, Hassan, and Lawrence (2008) use both a parametric (SFA) and non-parametric approach (DEA) to estimate the cost and profit efficiency of pre-and post-merger transactions. The sample of mergers consists of 440 US bank acquisitions from 1985 to 1999. The paper proves the improvement of cost and profit efficiency in bank mergers. By

studying all-sized bank mergers, the authors conclude that small bank mergers create more cost efficiency than large bank mergers while profit efficiency is significantly improved for both small and large banks.

2.2.2 Mergers and acquisitions

Many studies on mergers and acquisitions (M&A) have investigated what could affect the post-acquisition performance of bidding firms. Yet these have mainly focused on the impact of single or multiple factors from deal characteristics and/ or firm information. Interestingly, the influence on acquirers' return of an individual determinant becomes deepened, weakened or uncertain when introducing a second factor or more than one other. The previous studies are just pieces of the puzzle in terms of understanding the bidders' post-acquisition returns. There are a few documents that have explored the combined effects by considering all of the determinants together.

The impacts of some determinants are strengthened when involving other factors. For instance, Travlos (1987) demonstrates that bidding firms that complete deals using stock as payment earn significantly negative abnormal returns whereas firms with cash offers earn their normal return at the event date. This finding is attributed to the signalling hypothesis whereby the market regards stock payments as negative information where overvalued bidders finance acquisitions using their own stock, which is consistent with the adverse selection framework in Myers and Majluf (1984). Loughran and Vijh (1997) investigate the influence of acquisition mode and payment method on post-acquisition performance. Merger bids and stock offers are associated with negative acquisition returns. In particular, bidders' excess returns are significantly more negative when the merger bids are paid with stock. In contrast,

bidders in cash tender offers earn significantly positive excess returns. The excess returns for target shareholders are not significantly positive, and even negative when the relative target size is large. Moeller et al. (2007) posit that both diversity of opinion and information asymmetry have a strong negative effect on acquirer return in stock offers.

The impact of target status (Officer, 2007) is reinforced when taking into account payment method (S. Chang, 1998). Officer (2007) investigates discounts when private or subsidiary targets are acquired from the perspective of sellers of these firms. Compared to acquisitions of public targets, acquiring unlisted targets generates on average 15% to 30% of acquisition discount. The parent companies of these unlisted targets benefit from the sale by having improved liquidity. The discounted sale price is affected by sellers' pre-takeover stock performance, other available sources of liquidity and information asymmetry between the acquirers and sellers of targets. S. Chang (1998) sheds lights on the role of target status in determining takeover announcement return for bidders. The influence of private or public status varies with different methods of payment. He suggests that bidders with stock financing earn positive abnormal returns when acquiring private targets and losses when acquiring public ones. Furthermore, bidders earn zero abnormal returns in cash deals. Positive returns in stock offers can be explained by previous target shareholders becoming incremental monitors of the combined firms, therefore effectively reducing agency cost and improving post-acquisition performance. Additionally, target shareholders' acceptance of stock offers conveys a positive signal to the bidders and the market.

On the other hand, the effects of some factors are uncertain or even controversial,

such as Tobin's Q. Tobin's Q, defined as a firm's market value over the book value of its equity (M/B), is positively related with acquirer return. Lang et al. (1989) analysed the Tobin's Q (MV/B) of both bidders and targets in completed tender offers. The bidding firms with high q earn more abnormal return for shareholders than the ones with low q whereas the targets with low q gain more than high q targets. Strikingly, both bidders and targets can benefit from the acquisition in which bidders have a high q and targets have a low q. The result can be explained by the positive market reaction and increased investment opportunities when high q bidding firms acquire low q targets. Servaes (1991) develops the research of Lang et al. (1989) with a wide sample consisting of mergers and tender offers and with more deal characteristic variables controlled. The results support the previous research and show that bidding firms and targets profit mostly from acquisitions in scenarios with high q acquirers and low q targets in both mergers as well as tender offers. The relationship between q and takeover gains is improved with deal variables added. Moreover, Tobin's Q is proved to be not correlated with other deal characteristics in determining acquisition return.

In contrast, Dong et al. (2006) employ the reverse B/M as the q ratio and find that bidders with a high q (B/M) earn positive returns. Another example is hostility. Servaes (1991) indicates that acquirers involved in hostile bids earn less while Schwert (2000) finds that bidder return is unaffected by the takeover attitude. Schwert (2000) analyses the distinctions between friendly and hostile takeovers. He concludes that acquisitions with larger-size targets are more likely to be hostile, and hostile bids are related to a decrease in bid success rate, a slightly higher takeover premium, and a higher probability of competing bids. Bidder return and pre-bid run-up are found to be unaffected by takeover attitude. Furthermore, the resistance of

hostile takeovers is attributed more to the bargaining hypothesis (seeking a better price) than to the entrenchment hypothesis (refusing to be acquired).

2.2.3 Application of M&A index

The composite index is widely applied to research analysis in macro-economics, such as Gross Domestic Product (GDP), Genuine Progress Indicator (GPI), and Human Development Index (HDI). Sharpe (2004) indicates that a composite indicator could aggregate multi-dimensional information and reflect the nature and reality of research issues. Moreover, a single composite indicator facilitates the interpretation of the study and comparison between different samples and makes it easier to attract the public's attention and interest.

In corporate finance, composite indicators are increasingly recognised and adopted to qualify and simplify abstract studies. Lamont, Polk, and Saa á-Requejo (2001) developed the KZ index by adopting the coefficients for variables in Kaplan and Zingales (1997). Afterwards, the KZ index has been widely used as a measurement of financial constraints to analyse cash-flow sensitivity (Almeida et al., 2004), investment (Baker et al., 2003) and R&D investment (D. Li, 2011).

Moreover, Gompers et al. (2003) created a Governance Index to measure how much rights shareholders tend to gain in target companies. A higher Governance Index implies a higher level of shareholder interest, less agency problem and better stock performance. Bebchuk et al. (2009) constructed the Entrenchment Index by including more governance provisions. The Governance Index and Entrenchment Index make it easier to incorporate the quality of corporate governance in studies (e.g. (Chae et al., 2009; Dittmar & Mahrt-Smith, 2007; Jiraporn & Gleason, 2007;

Masulis et al., 2007; Villalonga & Amit, 2006).

Corporate governance or firms' financial situations are abstract, complicated, and multi-dimensional. Financial ratios or descriptions are unable to capture and analyse abstractive topics. The single indicator makes it possible and easier to investigate these studies by just adding the index as the variable. M&A are one of the largest investments possible and have an essential and long-term influence on firm performance. A composite index is necessary for researchers to represent overall takeover quality and measure takeover impact. Therefore, the following papers could simply investigate M&A-related studies by incorporating M&A index as a variable.

M&A index can be regarded as an indicator of market reaction to acquisition announcement and can be adopted by the management of merging firms. Luo (2005) demonstrates that market reaction to takeover bid is taken into account by merging firms when deciding whether or not to complete the transaction. "Learning from outsiders" can be interpreted that the market has better access to the target's information, industry and economic situation and therefore evaluates the acquisition more comprehensively and objectively than the bidder itself. Thus, smaller-sized bidders are more willing to consider the market's opinions due to their disadvantage in terms of information flow. Managers of acquiring firms are more likely to consider the stock reaction when the deal is announced to the public before finalising any such deals. Additionally, bidders are prone to learning from the market, that is except firms in high-tech industries since technology firms disclose limited information to the public.

Currently, acquiring firms learn market reactions mainly from stock movements. Since changes in stock prices are absolute values, one cannot distinguish the degree

of optimistic or pessimistic market evaluations to takeover deals. Moreover, it is unreasonable to directly compare price changes between different acquisitions since the characteristics of firms and deals can be very different. Yet the M&A index could be an efficient indictor for insiders to interpret market reactions. The M&A index is an efficiency ratio of actual market reaction to what the market's response should be if inefficiency factors (such as overpayment) did not exit. A lower index implies a larger gap between actual and ideal stock reactions, indicating that outsiders are pessimistic on a particular acquisition. Furthermore, an ideal stock reaction can be regarded as the standard for each deal, therefore making it possible to compare different deals or previous and current transaction for identical bidding firms.

The M&A index can predict whether an acquisition will be completed and can therefore be utilised in merger arbitrage. Merger arbitrage or risk arbitrage is a common event-trading strategy based on M&A. The trading strategy is executed by holding stocks of target firms when a takeover bid is announced to the public and liquidating the shares when the deal is consummated and the target receives its acquisition premium. Investors can profit from merger arbitrage by earning arbitrage spread – the difference between the offer price and the purchase price when the target shares are purchased. The essential risk is whether the acquisition is successfully completed. Investors would suffer a loss if the takeover transaction fails (Andrade, Mitchell, & Stafford, 2001; Baker & Savaşoglu, 2002; Hutson & Kearney, 2005; Mitchell, Pulvino, & Stafford, 2002, 2004).

Previous studies on merger arbitrage have concentrated on return and factors affecting arbitrage return. (Andrade et al., 2001; Baker & Savaşoglu, 2002; Hutson & Kearney, 2005; Mitchell et al., 2002, 2004). Few studies have focused on

forecasting any takeover deal completion rate. Branch and Yang (2003) constructed a model for predicting deal success rate by involving a step-wise logistic regression with a completion dummy as the dependent variable. The success probability for each deal is calculated by involving the coefficients of variables representing firm or deal characteristics. The prediction model is limited since the coefficient of each factor is estimated by previous takeover deals. The relationship between each variable and completion rate may change since various industry and market situations affect acquisitions as well.

In contrast, the M&A index does not rely on the estimation of previous acquisitions and instead focuses on pre-bid firm information and deal characteristics on deal announcement dates. Due to the strong and positive relationship with deal success rate, the M&A index can be regarded as an indicator of the predictability of acquisition completion. Besides merger arbitrage, investors can further develop their investment strategy using the M&A index as higher indices imply better performance in both the long and short run. The following section proves that investors could benefit from a buy-and-hold strategy within six months and earn excessive returns and positive alpha.

The M&A index could also be meaningful for analysts. Mergers and acquisitions draw the attention of many financial analysts as takeover activities may alter their analyst buy/sell recommendations and coverage decisions. Tehranian et al. (2013) point out that the accuracy of earnings and return forecasts influence analysts' decisions on whether or not to cover merging firms. Inaccurate forecasts and recommendations may harm analysts' reputation and threaten their careers. Therefore, analysts with greater ability, insider information or that put in more effort

are more likely to cover merged firms after acquisition. According to Tehranian et al. (2013), financial analysts that cover target firms are prone to following merged firms when takeover deals are regarded as good-quality transactions, in which bidding firms pay a lower acquisition premium and earn a higher return during the announcement period.

The M&A index is estimated by only involving pre-bid information and public information on announcement day. As a measurement for takeover quality, a higher M&A index is associated with a higher probability of deal consummation, a lower paid premium and better post-acquisition performance in both the long and short run. Therefore, the M&A index can be used to forecast merger outcomes and stock performance after announcement dates. Financial analysts could take advantage of the M&A index to improve the accuracy of their coverage and buy/sell recommendations even in the absence of private or insider information. Moreover, the single and comprehensive score (M&A index) for each deal could simplify and facilitate analysts' analysis of takeover transactions.

2.3 Hypotheses

This section formulates hypotheses on the relationship between the M&A index and takeover outcomes, including the probability of deal completion, acquisition premium, short-run announcement return and long-run post-acquisition performance.

Luo (2005) argues that the probability of deal completion is influenced by the market response to a takeover announcement as an acquirer's management would learn from the market's reaction whether or not to complete a takeover transaction. The M&A index, computed as a ratio of actual acquirer return to the optimal announcement

return, could be an alternative indicator of market reaction to announced deals. The announcement return reflects the market's reaction and expectations of an attempted acquisition immediately after the public release; the optimal announcement return is the highest return that an acquiring firm could reach if a deal is completely efficient. A higher M&A index implies that the acquisition is closer to an efficient deal and therefore has better takeover quality. Therefore, acquiring firms would be motivated to complete such a deal if the market appraisal is positive and significant. As a result, this study proposes the following hypotheses:

H1: *Probability of deal completion is positively related with M&A index of bidding firm.*

Bid premium is defined as the log percentage difference between the bid price and the pre-bid target value over the latter (Baker et al., 2012). Previous studies indicate that a larger premium is paid to public targets (Schwert, 1996). Baker et al. (2012) show that bidders pay an average premium of 45.65%. Acquisition premium are taken into account by investors to evaluate takeover transactions. A larger premium paid may demonstrate that the management of the acquiring firm is overconfident about their takeover synergy and their abilities to run the merged firms, and therefore overpay for the target (Roll, 1986). A high offer premium increases the cost of an acquisition, possibly resulting in a negative market reaction and an abnormal decreased return on the announcement day. Therefore, a higher premium would lead to a lower M&A index. Consequently, this chapter establishes the hypothesis that:

H2*: Bid premium is negatively related with M&A index of bidding firm.*

Olson and Pagano (2005) illustrate that short-term stock reaction reflects investors'

expectations of takeover deals. Therefore, acquisition partners would benefit from higher stock returns if investors have better reactions and expectations of takeover transactions. The M&A index measures the shortfall between actual acquirers' return and optimal return at the time of announcement, which shows the market's response to an attempted acquisition. A higher index implies that the market positively responds to the acquisition. Therefore, a more efficient deal with a higher index is expected to have better stock performance in the short run. As a consequence, the chapter assumes:

H3: *Acquirer announcement return is positively associated with M&A index of bidder.*

Andrade et al. (2001) indicate that post-merger operating performance reflects whether acquirers eventually obtain the gain expected at the announcement date. Hence, long-run operating performance signifies the takeover quality and synergy gain to acquirers. Takeover deals with higher M&A indices imply that market participants are more optimistic about merger outcomes. Therefore, more efficient deals are expected to generate more synergy gains for acquirers in the long run, which would be realised in the form of post-merger profitability. A higher M&A index implies better long-run operating performance. Therefore, the chapter develops the hypothesis that:

H4: *Long-run post-merger operating performance is positively related with M&A index.*

2.4 Methodology

2.4.1 Motivations to use stochastic frontier analysis to construct M&A index

Previous studies documented that the frontier efficiency methodology, including stochastic frontier analysis (SFA), is superior to traditional financial ratios. Cummins and Weiss (1999) employ stochastic frontier analysis to examine the performance of US insurance firms. They emphasise that the frontier efficiency method has advantages over the conventional financial ratio to measure firm performance. SFA compares current firm status with the best performance when profit is maximised or cost is minimised. Moreover, a single indicator generated from SFA captures comprehensive determinants of performance and has a solid theoretical background in economics. Moreover, the SFA approach ignores the various characteristics among firms and facilitates comparison across firms, industries and even nations. Additionally, SFA provides alternative methods to prove economic or financial hypotheses. For instance, SFA could be applied to corporate governance research to test whether or not managers maximise shareholder value (agency problem). By analysing inefficiency in firm performance, management could improve governance and performance by reducing or eliminating inefficient elements in companies. Oral and Yolalan (1990) study the operating performance and profitability of Turkish commercial banks by applying data envelopment analysis (DEA) – another efficiency methodology like stochastic frontier analysis (SFA). They suggest that the financial ratio describes the current firm status or short-term changes in bank performance. Many determinants of performance, such as management or investment decisions, cannot be captured in traditional ratios but can be taken into account in efficiency analysis. Efficiency could reflect comprehensive bank

performance in the long term and assist management in allocating financial resources among bank branches more efficiently. Farrell (1957) demonstrates that technical efficiency takes into account many factors that affect performance and help to analyse firm performance more comprehensively while the traditional financial method just reflects a single dimension.

Moreover, the other estimation method is not appropriate to construct a composite index for M&A. Firstly, linear regression with ordinary least squares is exculpated from the possible methodology. Clearly, the cross-impact of factors in both firm information and deal characteristics is not just linearly related to acquirers' return. The coefficients in linear regression (with Ordinary Least Squares OLS) cannot indicate the relatively accurate correlation between each variable and acquirers' return because of the uniqueness and complexity of acquisitions.

Secondly, it is inappropriate to employ principal component analysis (PCA) in multivariate analysis. Although PCA is widely used to construct composite indices, the basic idea is that a composite index is the linear combination of principal components. The principal components are further linear combinations of original variables. In all, PCA is essentially a linear-based method. Therefore, PCA is not appropriate to solve the non-linear relation between each determinant of acquisition return.

Lastly, SFA is relatively appropriate to measure mergers and acquisitions and is a parametric approach used to measure firms' efficiency, which centres on how to realise more outputs (return on acquisition). Efficiency, especially productive efficiency, is meaningful for takeover activity.

2.4.2 The M&A index

2.4.2.1 Takeover efficiency and acquirers' announcement return

This chapter aims to create a composite index to evaluate takeover activities. Previous M&A studies have lacked an indicator to comprehensively measure and reflect the acquisition outcomes, including the probability of deal completion, premium, announcement return, and long-run post-acquisition performance. Therefore, this chapter introduces the new concept of "takeover efficiency", which is measured by the M&A index. Takeover efficiency examines whether the takeover process is efficient: for example, whether bidding firms overpay for the targets, whether the target's management resist the takeover, or whether bidders adopt an effective payment method. The concept of takeover efficiency is proposed to evaluate takeover deals that have already been announced to the public, rather than to discuss whether an acquisition attempt should be initiated. Takeover efficiency is a "relative" term, which compares the actual takeover outcome and the theoretically outcome if the deal is processed in the most efficient way. To take an analogy, pasta is delicious and can be scored at 10 (optimal). The score of pasta will be lower, say 7, if too much salt is added or the pasta is over-boiled. "Pasta", the dish, is the takeover. "Too much salt" and "over-boiled" are examples of inefficiency. Whether or not to eat the pasta is not discussed; whether or not the pasta tastes delicious is the question.

The creation of "takeover efficiency" is motivated by literature that applies stochastic frontier analysis (SFA) to the managerial problem (Habib & Ljungqvist, 2005) and IPO underpricing (Hunt-McCool et al., 1996). Habib and Ljungqvist (2005) examine the agency problem using a ratio of actual Tobin's Q to the optimal

Tobin's Q for each firm, representing the firm efficiency to achieve best performance. Hunt-McCool et al.(1996) compare the actual initial price with the theoretically optimal share price to study whether the firm is efficiently valued in IPO. Inspired by these references, this chapter attempts to seek an informative output to measure the overall takeover quality and represent the "productivity" of M&A. The indicator on announcement day is preferred, since the M&A index (the benchmark for takeover efficiency) is expected to predict the deal outcomes in the medium term and even in the long term. In addition, acquisition premium is not significantly related with deal outcomes. Finally, this chapter selects the acquirers' return at the announcement (Day 0), which reflects market reaction to takeover transactions and expectation of deal outcomes. Moreover, a strong-form efficient market is assumed.

In a strong-form efficient market, security price would adjust fully and immediately after information is released. Therefore, acquirers' stock on deal announcement dates should reflect the market reaction and expectations regarding the takeover bids. Higher acquirer return at announcement suggests that the market is more optimistic of the outcomes of the merger, including the probability of deal completion and post-acquisition performance. Therefore, this chapter adopts acquirers' return on announcement day as the output for the M&A index. Acquirers' stock performance is included in the M&A index's construction rather than combined firms' stocks is because acquirers generally have much larger firm size than targets. On average, acquirer firm size in the full sample is 32.9044 times larger than target size. The value-weighted returns of combined firms are strongly affected by acquirers' announcement return. Additionally, the takeover sample is limited to the deals in which acquirers take control of their targets after acquisition.

Optimal announcement return can be achevied in an efficient deal. Ideally, takeovers would expand a business efficiently by generating synergy gains and improving the acquirers' financial and operational performance (Devos et al., 2009; Hoberg & Phillips, 2010; Houston et al., 2001). Therefore, acquirers should have received positive market reactions and expectations regarding their takeover announcements. The return gained in an ideal takeover deal is the optimal announcement return of acquiring firms. However, the actual acquirer return is less than the optimal value due to concerns of acquirers' agency cost, such as the CEO hubris problem, the motivation of empire-building, resistance from target management, and overpayment for the target. A smaller disparity between the actual and optimal announcement returns signifies fewer agency problems in takeover deals and therefore results in better deal quality.

In this chapter, takeover efficiency is defined as acquisitions maximising acquirers' announcement return. Higher-efficiency deals suggest a smaller deviation of actual acquirers' return from the optimal gain and imply lower agency cost and better deal quality.

2.4.2.2 Constructing a benchmark for takeover efficiency

To score takeover efficiency, this chapter uses the production function in SFA (Aigner et al., 1977; Meeusen & van Den Broeck, 1977). SFA evaluates firms' ability to maximise their output given a set of inputs (production function) or to minimise their costs given a set of outputs (cost function). In order to measure the degree of efficiency of takeover deals, this chapter employs the production function in SFA. There are two reasons for not adopting cost function. On one hand, the cost in takeover activities refers to acquisition premium, which cannot fully reflect the deal

quality. Previous M&A literature finds no evidence that premium is significantly associated with takeover outcomes. On the other hand, cost function requires taking the logarithm of premium (cost), the input and output (also required in production function). Therefore, the application of cost function would include fewer takeover deals in the sample than the selection of production function.

Production function in SFA allows this study to compare the actual takeover outcomes with the estimated outcomes in efficient deals. Inspired by M&A literature and previous SFA studies (Habib & Ljungqvist, 2005; Hunt-McCool et al., 1996), this chapter finally adopts the acquirer return on announcement return to reflect the productivity of M&A and evaluate takeover outcomes. Specifically, takeover efficiency, measured by the M&A index, is defined as the takeover bid that can maximise acquirer return on the announcement day. In itself, the M&A index is the technical efficiency of the production function and is expressed as acquirers' observed return divided by the optimal gain at announcement.

This construction of the M&A index begins with the production function and includes the acquirers' adjusted return on announcement day ACQ_RET_i , which measures the acquisition impact as the output. The acquirers' adjusted announcement return ACQ_RET_i is calculated as a ratio of the actual acquirers' return Ret_i at a date announced over the hypothetical return $E(R_{it})$. The stock price information for Ret_i and $E(R_{it})$ are adopted from the CRSP database. The expected return $E(R_{it})$ is calculated by the market model (Brown and Warner, 1985) with the estimation period starting from 200 trading days to 20 trading days before the announcement day. To obtain the parameters, firms' daily returns are regressed on value-weighted market returns over the estimation period. Finally, the predicted return $E(R_{it})$ is

obtained by using the coefficients and market return as at the announcement day.

Herein, this research does not employ abnormal return $Ret_i - E(R_{it})$ as the output as SFA requires the log transformation of the output. Therefore, output is limited to a positive value. To include more takeover transactions, the author takes into account the ratio of actual announcement return over predicted return rather than abnormal return.

$$ACQ\_RET_i = \frac{Ret_i}{E(R_{it})} \quad (1)$$

$$E(R_{it}) = \beta_0 + \beta_i R_{mt} + \xi_i \quad (2)$$

Where ACQ_RET_i measures the acquirer's announcement return of the i^{th} firm. Ret_i is observed return for i^{th}firm on the date announced from CRSP. $E(R_{it})$ is the expectation of return calculated by the market model (Brown and Warner, 1985). R_{it} is the rate of return for the i^{th} firm on day *t* from CRSP, R_{mt} is the market value-weighted excess return on day *t* from CRSP.

The original production function for takeover efficiency can be estimated as follows:

$$ACQ\_RET_i = f(\mathrm{X}_i, \beta) \exp(\varepsilon_i) \quad (3)$$

$$\varepsilon_i = v_i - \mu_i \quad (4)$$

where ACQ_RET_i measures the acquirer's announcement return of the i^{th} firm. X_i is an input vector which affects the acquirer's return. β is a vector of the estimated coefficients. ε_i is a composite error component. v_i is the idiosyncratic component for the i^{th}deal, u_i is the inefficiency in the i^{th}deal.

In SFA, the error term ε_i is decomposed into random error v_i and inefficiency component u_i. The two-sided error component v_i is the same as the residual in the conventional econometric model, which is$v_i \sim N(0, \sigma_v^2)$ symmetric, identically and independently distributed with zero mean. The random error v_i represents idiosyncratic risk, which cannot be eliminated. The inefficiency component u_i represents the disparity between observed value and optimal value. The inefficiency

term u_i is caused by human error and can be reduced or even eliminated. u_i is an error with one-side distribution. Aigner et al. (1977) assume that inefficiency is distributed as half-normal distribution. Meeusen and van Den Broeck (1977) assume that the inefficiency component is exponential distributed. Stevenson (1980) assumes that the inefficiency term as truncated normal distributed.

Then, the study adopts deal characteristics and corporate fundamentals of acquisition partners as inputs. The vector of inputs is proven to affect acquirers' announcement return and is often included in the previous M&A literature as control variables. The sample for the M&A index is limited to public deals in which both the acquirers and targets are public firms, in order to incorporate firm and deal characteristics as comprehensively as possible. Definitions of these input variables are listed in Appendix A.

Due to the requirements of SFA, this chapter takes logarithmic transformations[14] of the outputs and inputs and also includes dummy variables to characterise deals. Finally, a frontier function for takeover efficiency (logarithm of equation (3)) can be written as:

$$\ln(ACQ\_RET_i) =$$
$$\beta_0 + \beta_1 \ln(Acquirer\ M/B_i) + \beta_2 \ln(Acquirer\ leverage_i) + \beta_3 \ln(Acquirer\ MV_i) +$$
$$\beta_4 \ln(Target\ M/B_i) + +\beta_5 \ln(Target\ leverage_i) + \beta_6 \ln(TransactionValue_i) +$$
$$\beta_7\ Hostile + \beta_8\ Tender + \beta_9\ Toehold + \beta_{10}\ Stock + \beta_{11} Competing +$$
$$\beta_{12}\ Diversification + v_i - \mu_i \qquad (5)$$

Specifically, the inefficiency component $u_i \geq 0$ and is assumed as exponential

[14] In SFA, log transformation is commonly applied due to the concern of skewness in the sample.

distribution (Meeusen & van Den Broeck, 1977). For takeover transactions, inefficiencies are mainly due to agency problems of acquirers, such as CEO hubris, empire-building[15], winners' curse and overpayment. When the inefficiency factor exists $(u_i > 0)$ in takeover transactions, the observed announcement return of acquirers would be negatively affected and less than the optimal announcement return. When the deal is fully efficient ($u_i = 0$), actual acquirers' stock performances are equal to the optimal announcement return. The above model (5) is estimated by the maximum likelihood estimation (MLE) method. In order to confirm the existence of inefficiency, the study runs a likelihood-ratio test and compares results with MLE and the model (5) estimated by ordinary least squares (OLS).

[Insert Table 2.1 About Here]

Table 2.1 tabulates coefficients of the independent variables for the production function and regression results estimated by OLS for comparison. The remarkable difference between SFA and OLS is the error component. SFA decomposes the error term into a random error and inefficiency component while OLS regards all errors as idiosyncratic. Therefore, the OLS method assumes that all takeover deals are efficient, in which acquirers could achieve the optimal (maximum) return on the announcement day. Therefore, the estimation results in the OLS method should be identical to the results in SFA if and only if the inefficiency component does not exist. In addition, this study conducts a series of likelihood-ratio tests to examine the presence of inefficiency. As a consequence, the null hypothesis that inefficiency does not exist is rejected at the 1% significant level. Lambda, $\lambda = \sigma_u/\sigma_v$, calculated

[15] Empire-building refers to the situation in which acquirers' management initiate acquisition attempts in the interest of management if their compensation is positively associated with firm size.

standing for the standard deviation of inefficiency against the standard deviation of a random shock, equals 0.4371. That is, the standard deviation of the inefficiency component is 43.71% of the standard error of the idiosyncratic component, suggesting that the inefficiency in the acquisitions should not be neglected. Therefore, the SFA is a more appropriate method to estimate the M&A index than the OLS.

Then, the study calculates the M&A index to measure the degree of efficiency for each takeover deal. In this chapter, a deal is defined as efficient if the acquisition maximises the acquirer's return on the announcement day. Therefore, the M&A index gauges the takeover efficiency by estimating the disparity between the actual acquirer's return and the optimal gain when the deal is announced to the public. The optimal announcement return is the maximised feasible return for the acquirer, which can be reached by reducing the inefficiency issues (agency cost in acquisitions). Specifically, the M&A index is computed as a ratio of the actual announcement return to the optimal return for acquirers, which in nature is a technical efficiency. The formula for M&A index is specified as follows:

$$\text{M\&A index} = \exp\{-u_i\} = \frac{ACQ\_RET_i}{ACQ\_RET_i^*}$$

where u_i represents a one-side error for inefficiency in the i^{th}deal, ACQ_RET_i is the observed acquirer's announcement return, and $ACQ\_RET_i^*$ is the optimal acquirers' announcement return on the announcement day.

Due to the existence of inefficiency in takeover transactions, ACQ_RET_i is less than $ACQ\_RET_i^*$. Therefore, the merger efficiency index (M&A index) ranges from 0 to 1. If the M&A index equals one, the bid is on the frontier, which indicates that the

acquirer receives the highest (optimal) return on the announcement day.

2.5 Data

2.5.1 Data selection criteria

Data is gathered from several databases. Takeover events and relevant information are collected from Thomson ONE. This chapter employs a sample of US takeovers announced between January 1, 1980 and December 31, 2012. Due to data availability limitations, the study only includes public acquisitions, in which acquirers and targets are/were publicly listed firms. The original sample is 28,065 deals including successful and failed transactions. Takeover deals worth less than $1 million are excluded. The study also requires that acquirers take control of their targets after the acquisitions and thus own more than 50% of their target, which brings the sample down to 14,706 deals. Financial information and price/return data were obtained from COMPUSTAT and Center for Research in Security Prices (CRSP), respectively. The takeover sample is then merged with COMPUSTAT and CRSP by excluding missing values, leading to a final sample of 6,254 deals.

2.5.2 Descriptive data

[Insert Table 2.2 About Here]

Next, the M&A index is computed for each takeover deal. Table 2.2 reports the M&A index for the full sample and the distribution of M&A indices across year and industries (Fama-French industry classification). On average, the M&A index for the full sample is as high as 0.9795 with a minimum of 0.6928 and maximum of 0.9969. Among the 6,254 deals in the final sample, only 30 bids have indices less than 0.90.

This fact is due to the limitation of stochastic frontier analysis. SFA requires taking the logarithm of output; therefore, only deals with positive acquirer return are included. According to previous M&A literature, bidding firms tend to have negative abnormal return on the announcement day (the difference between acquirer return and market return). Therefore, the deals selected in our sample are good and efficient relative to the deals with negative acquirer return. More importantly, high average M&A indices indicate that public acquisitions are quite efficient, which could be explained by the nature of public deals reinforced by market efficiency. Compared to acquisitions involving private targets, acquiring firms in public transactions involves full information disclosure, enabling better takeover deals to be identified, which in turn results in more accurate valuations and better market responses. However, M&A indices are all significantly different from 1 (at the 1% level), suggesting that deals are not completely efficient.

In Table 2.2, Panel B shows the M&A index and the number of acquisitions distributed by year. In general, the difference of the M&A index is small among deals for each year. A merger "boom" can be seen between 1994 and 2000, during which the number of takeover transactions is above 300 each year. The average efficiency degree gradually decreases. In the early years of the boom (1994 and 1995), acquisitions are seen to be more efficient than those that occurred before then. Conversely, the M&A indices in the later period (1996 to 2000) are much lower, indicating that acquisitions driven by the merger boom are less efficient due to more irrational decisions being made by acquirers. Moreover, takeover efficiency is negatively affected by the financial crisis with M&A indices around the year 2008 much lower.

In Panel C of Table 2.2 , acquisitions are classified according to the Fama-French industry classifications. Transactions are concentrated in the business equipment and financial industries. Moreover, takeover deals in the financial industry yield relatively higher M&A indices than other industries, owing to the expertise and experience of financial firms.

[Insert Table 2.3 About Here]

Table 2.3 presents the summary statistics of corporate fundamentals and deal characteristics. The full sample is divided into low-efficiency and high-efficiency deals based on the M&A index. The differences in the M&A index are statistically significant between the high-efficiency and low-efficiency deals. Moreover, acquirers in high-efficiency deals have better financial (lower leverage) and operating performance (higher returns on assets) than those in low-efficiency ones. In high-efficiency deals, target firms also have larger firm-size, higher Tobin's q and a higher return on assets.

2.6 Empirical results

In this section, the chapter explores the relationship between the M&A index and takeover outcomes, including probability of deal completion, short-run announcement return, and post-acquisition performance. Moreover, this study develops a trading strategy based on the M&A index.

2.6.1 Deal completion

Acquirer management learn from the market's response to deal announcements whether or not to consummate their acquisition attempts (Luo, 2005). The M&A

index could be an alternative indicator for market reactions to takeover announcements. Therefore, the M&A index is expected to be positively correlated with the probability of deal completion. To confirm the hypothesis, this study adopts univariate and multivariate models. In the univariate analysis, the whole sample is split into two subsamples based on the deal status: completed or withdrawn. Panel A of Table 2.4 shows that the index for the unsuccessful deals yields 0.9778 on average, which is significantly lower than the successful transactions (by 0.0019). This finding indicates that in the sample with positive acquirers' return, deals with a higher M&A index are more likely to be completed.

[Insert Table 2.4 About Here]

This study then proceeds with probit regressions as a robustness check for the previous findings. In Panel B of Table 2.4, the dependent variable is a dummy variable, which equals one if a deal is consummated and zero otherwise. The independent variable is the M&A index. The firm and deal characteristics are controlled in all of the regressions. Models 2 and 4 control the year and industry fixed effects. The acquirer clustering effect is also considered in Models 3 and 4. In all the models, the coefficients of the M&A index are positive and significant at 1%, which is consistent with the findings in the univariate analysis. Hence, the takeover deal is more likely to be successfully completed when the actual acquirer's announcement return approaches the optimal value (higher M&A index). According to Luo (2005), acquirer management take into account the market's reactions to determine whether or not to complete takeover transactions. As a consequence, bidding firms with a better market response (more positive acquirer announcement return) are motivated to consummate their deals. Additionally, higher-efficiency

deals (higher M&A indices) may suffer less resistance from targets' management, leading to a higher rate of completion.

In addition, larger-value transactions tend to reduce the probability of success. There is a negative relationship between hostile deals and likelihood of completion, which is consistent with the results of previous studies (Baker et al., 2012; Schwert, 2000). In addition, the probability of deal completion decreases when multiple bidders are engaged in the takeover bid (Walkling, 1985). In contrast, transactions is more likely to be completed when the deal is a tender offer (Baker et al., 2012).

2.6.2 Acquisition premium

In this section, the study investigates the relationship between the M&A index and the bid premium paid by acquirers. The acquisition premium is defined as the log percentage difference between the offer price and target stock price 30 days preceding the announcement date (Baker et al., 2012). In Panel A of Table 2.5, the full sample is split into deciles based on the index for each transaction. The acquirers in the highest decile (10) pay an average 8.47% premium while the average premium for the lowest decile (1) is 23.20%. Acquisitions with a higher index are more efficient than deals with a lower index. Strikingly, the offer premium in the most efficient deals is 14.74% less than the premium in the least efficient transactions.

[Insert Table 2.5 About Here]

The study proceeds with multivariate analysis to justify the previous findings in Panel B of Table 2.5. All of the models include variables that are proven to have a strong impact on premium in previous studies. The industry and year fixed effects are controlled in Models 2 and 4. The results in the regression are the robustness of

the findings in the univariate analysis. The M&A index is negatively and significantly related to the offer premium. The coefficient is -7.3673 for the index even with other variables and fixed effects controlled. Therefore, acquirers in deals with a higher index pay a notably lower premium. In other words, M&A efficiency is negatively associated with premium for bidders with positive return on announcement day. Costing less is one aspect of acquisition efficiency that we define. Our finding confirms that in the acquisition sample with positive acquirer announcement return, the benchmark can be used as a measurement for M&A efficiency, at least in terms of cost-saving.

Moreover, this study provides evidence of a relationship between other explanatory variables and offer premium. The target 52-week high price is positively related with offer premium, which is consistent with Baker et al. (2012). Larger-sized acquirers tend to spend more while larger-sized targets receive a smaller bid premium (Moeller et al., 2004). The premium increases when the acquirer finances their acquisition using their own stock. Transactions involving multiple bidders are also associated with a higher premium (Walkling & Edmister, 1985). Acquirers pay a higher premium in hostile deals (Bargeron, Schlingemann, Stulz, & Zutter, 2008) and in diversification transactions. Tender offers also increase the offer premium (Schwert, 2000).

2.6.3 Post-acquisition stock performance in short run

Next, this study investigates whether the M&A index predicts acquirers' stock performance shortly after deal announcement. The short-run stock performance is measured by the cumulative abnormal returns (CARs) over the period from 3 days to 5 days after the takeover announcement (ACAR (+3, +5)). The cumulative abnormal

returns are obtained based on the market model (Brown & Warner, 1985). The estimation period for the market model parameters start at 220 trading days prior to the announcement day and end 20 trading days before it. The acquirers' CARs are then computed with a post-event period of three days (ACAR (+3, +5)). As the return on announcement day (day 0) is included in the M&A index, this chapter excludes the date surrounding day 0 to avoid issues of endogeneity. Table 2.6 reports the relationships between the M&A index and ACAR (+3, +5) in Panel A (univariate) and Panel B (multivariate analysis).

[Insert Table 2.6 About Here]

In Panel A of Table 2.6, the full M&A sample is divided into low-efficiency and high-efficiency subsamples on the basis of the M&A index. On average, the ACAR (+3, +5) is 0.0563% in the subsample with high-efficiency deals, which is 0.1145% higher than the return obtained in the low-efficiency ones. The univariate analysis suggests that acquirers in higher-efficiency deals a greater return shortly after the announcement day. The study then runs a regression on the M&A index estimated with the ordinary least squares (OLS) method. All four models involve control variables, including firm and deal characteristics. Additionally, Models 2 and 4 incorporate year and industry effects. Models 3 and 4 include acquiring firm clustering effects. Panel B of Table 2.6 lists the multivariate regression results and further supports the findings in the univariate analysis. The coefficients for the M&A index take a positive sign and are statistically significant at the 1% level, indicating that acquirers in higher-efficiency deals (higher M&A indices and more positive return on announcement day) achieve a higher short-term return following takeover announcement. The results suggest that, in this sample, takeover deals with higher

M&A indices are more efficient and produce better takeover quality, proxy by post-acquisition stock performance in the short run.

2.6.4 Post-acquisition stock performance in medium and long run

Furthermore, the study expands the research on long-run stock performance and explores the duration for the M&A index to predict the post-acquisition performance. Specially, long-run stock performance is estimated by buy-and-hold abnormal returns in the medium period (3 months, 6 months, and 9 months) and long run (12 months, 24 months and 36 months). Following Bouwman, Fuller, and Nain (2007), the buy-and-hold abnormal returns (BHARs) are calculated by subtracting the buy-and-hold return of the reference portfolio from the buy-and-hold return of acquirers. All of the reference portfolios include 50 portfolios in total, classified according to their size (market valuation) and book-to-market ratios. Next, buy-and-hold return for the reference portfolio is computed by compounding the average return for each portfolio. Finally, BHARs are obtained using buy-and-hold return for each acquirer minus the buy-and-hold return for the reference portfolio.

[Insert Table 2.7 About Here]

In Table 2.7, the finding shows that the index is positive and significantly associated with buy-and-hold abnormal return in all regressions. In Panel A, the coefficients for the M&A index are statistically significant within one year following acquisitions even with fixed-effects and acquirers' clustering effects controlled. Panel B shows no significant relationship between the M&A index and buy-and-hold return for 12 months, 24 months and 36 months. The results above indicate that the M&A index is predictive for acquirer post-acquisition stock performance in the medium run. The

forecast horizon for the benchmark is within one year after the announcement date. Additionally, buy-and-hold return is negatively affected by transaction value, cash payment and diversification deal in which acquiring firms and target firms do not operate in the same industry.

2.6.5 Post-acquisition operating performance in long run

According to Andrade et al. (2001), the expected gains on takeover announcements are realised in the form of post-merger profitability. Therefore, post-acquisition operating performance can be regarded as an indicator of takeover quality and synergy gain in the long run. Specifically, this study examines the relationship between M&A index and post-acquisition operating performance, gauged by "Industry-Adjusted Return on Asset" (IAROA; Healy et al., 1992). The IAROA is calculated as the difference between the acquirer's ROA and the median ROA of firms in the same industry as the acquirers.

[Insert Table 2.8 About Here]

In Table 2.8, the dependent variable is the average IAROA of the acquirers (A_IAROA) over a three-year window after the acquisitions. Control variables are included for firm and deal characteristics in all regressions. Fixed effects of year and industry are controlled in Models 2 and 4. In addition, Models 3 and 4 include acquirer clustering effects. In Table 2.8, coefficients of the M&A index are positive and statistically significant at 1% in all of the regressions, implying that more efficient deals outperform less efficient ones in terms of post-acquisition profitability. A higher value of M&A index signifies smaller deviation from the optimal acquirer gain, indicating that the market is more optimistic regarding the outcomes of a deal.

Therefore, higher-efficiency deals yield to higher acquirers' operating performance in the long run.

Combining the findings on deal completion, bid premium and post-acquisition performance in the long and short run, the empirical results shows that the M&A index is forward-looking and has strong power in forecasting acquirers' post-takeover performance. Due to the restrictions of SFA, "acquirers" refers to bidding firms with positive return on announcement day. Therefore, the forecasting power of the M&A index is limited to "relatively good deals".

2.6.6 Trading strategy

Finally, the study develops and empirically tests the trading strategies based on the M&A indices. Specifically, the full acquisition sample is divided into three groups (portfolios) according to the value of the M&A index. Portfolio 1 includes deals with the lowest M&A indices; Portfolio 2 includes deals with moderate indices; and Portfolio 3 includes deals with the highest indices. The trading strategy is to buy and hold the acquirers' stocks over the post-acquisition period. The holding period lasts one, two, three, four, five and six months, respectively.[16]

The return, r_{it}, for the i^{th}deal on day *t* is the acquirer's daily return obtained from the CRSP database. This study then compounds daily returns over the holding period T $R_T = \prod_{i=1}^{T}(1 + r_{it}) - 1$. The monthly return is the geometric mean of the holding period return, denoted by $R = (1 + R_T)^{30/T} - 1$. In addition, this research adopts alternative measurements of trading performance, alphas from a standard

[16] To avoid possible large price swings accompanying merger announcements, the study excludes the announcement day and starts to hold acquirers' stocks from the day after announced date.

CAPM model (Sharpe, 1964), the Fama-French three factors, the Fama-French four factors and the Fama-French five factors (Carhart, 1997; Fama & French, 1993, 2015).

[Insert Table 2.9 About Here]

In Table 2.9, Panel A presents the average return over various holding periods for the three portfolios. Strikingly, acquirer firms with the highest indices earn around a 7% higher monthly return than the bidders with the lowest indices in the same holding period. The difference of the holding return is significant between the most efficient deals (Portfolio 3) and the least efficient deals (Portfolio 1). When holding acquirers' stock for one month after takeover announcement, acquirers in the most efficient deals gain 7.89% more than firms in the least efficient ones. In each portfolio, monthly returns improve as holding periods increase. However, the discrepancy between Portfolio 3 and Portfolio 1 reduces from 7.59% to 6.92% in terms of monthly return. Similarly, acquirers in Portfolio 3 profit more than bidders in Portfolio 2. The gap between these two groups ranges from 2.17% (six-month holding) to 3.97% (one-month holding) and are significant at 1%. In addition, Panel B shows the monthly alpha over the post-acquisition holding period. Alpha (monthly alpha) is obtained from the CAPM and Fama-French models respectively by regressing daily alpha (monthly returns) on market premium and multiple factors. Similar to the findings for monthly return, the results show that acquirers in more efficient deals achieve a significantly higher alpha than firms with in less efficient ones. This is especially when acquirers' stocks are held for one month following takeover announcement: the monthly alpha (obtained from the CAPM model) in Portfolio 3 is at least 9% higher than the monthly alpha in Portfolio 1, which is

robust in the Fama-French three-factor model and four-factor model. The gap between the most efficient deals and the least efficient ones narrows from above 9% to around 1% as the holding period lasts longer.

[Insert Table 2.10 About Here]

Next, this study reclassifies takeover deals using the Fama-French industry classifications and then divides the transactions that occurred in the same industry into three subgroups based on their M&A indices. Table 2.10 lists the acquirer return and monthly alpha data over one month after takeover announcement in various industries. The M&A indices are positively and significantly associated with holding period returns in all industries. In particular, in the energy and telecoms industries, the acquirers' return in the group with the highest indices is around 13.3% more than the portfolio with the lowest indices.

[Insert Table 2.11 About Here]

Finally, all takeover transactions are decomposed by every five years. In Table 2.11, more efficient deals outperform lower efficient ones in terms of holding return and monthly alpha for investors. In particular, the monthly alpha difference between Portfolio 3 and Portfolio 1 is the largest from 1980 to 1994. Over the holding period from 2005 to 2009, the acquirer returns and monthly alphas are lowest in the most efficient deals (one-month return is 4.89%, and monthly alpha is 3.53%) in all of the sample periods, which can be explained by the financial crisis in 2007-2008. However, the acquirers in the most efficient deals and therefore with the highest M&A indices still earn 9.76% higher return, i.e. the average monthly alpha of the acquirers is 9.76% higher than that of the acquiring firms in the least efficient deals.

In a nutshell, higher M&A indices are associated with better stock performance in most industries over time. Investors could benefit most from holding the stocks of acquirers in the most efficient deals.

2.6.7 Inefficiency in takeover transactions

In this section, the entrenchment index (E-index) (Bebchuk et al., 2009) is included to investigate whether the M&A index could reflect takeover efficiency, whether the efficiency degree of transactions is affected by agency conflicts of interest, and what the M&A index captures. The entrenchment index (Bebchuk et al., 2009) is a composite indicator to evaluate corporate governance. According to Bebchuk et al. (2009), firms with a higher E-index are associated with lower firm value and stock returns, implying that firms with a higher E-index may suffer higher agency cost. The E-index is constructed manually based on the six provisions of Corporate Takeover Defenses released by IRRC (Investor Responsibility Research Center). Due to the limited data resources available, this study can only obtain E-index figures published and contributed by Professor Bebchuk who created the model. Public data only covers the S&P 500 and some important firms over the period from 1990 to 2006.

[Insert Table 2.12 About Here]

The final sample consists of 989 takeover deals after merging the E-index file and the sample of the M&A index. Bebchuk et al. (2009) find that firms with a higher E-index are associated with lower firm value and stock returns, implying that firms with a higher E-index may suffer higher agency cost. Table 2.12 shows the univariate and multivariate analysis for the relationship between M&A index and acquirers'

agency cost. In Panel A, the full sample of takeover deals is divided based on E-index, and the average M&A indices is listed for each subsample. The index difference is significant between the high E-index subsample and the low E-index subsample. Acquiring firms in the group with a high E-index have lower M&A indices, suggesting that acquirers with lower governance quality are associated with lower level of takeover efficiency. Panel B of Table 2.12 proceeds with multivariate analysis and further examines the relationship between M&A index and governance quality as well as other inefficiency factors. As a consequence, the coefficients of E-index take a negative sign and are significant at the 1% level. This result supports the previous findings, which indicate that a lower governance quality of acquiring firms significantly reduces the degree of efficiency of takeover deals. The empirical results also show that the M&A index is negatively and significantly related to the acquisition premium, indicating that an increase in payment leads to a decrease in the M&A index and therefore takeover quality. Moreover, deals completely paid with cash increases the efficiency degree of transactions. These findings are consistent with common sense and the assumption of the M&A index, suggesting that the M&A index could reflect takeover efficiency.

2.7 Conclusion

This chapter develops a composite indicator (M&A index) to measure takeover efficiency and re-evaluate takeover quality. A deal is efficient when the takeover bid maximises the acquirer's return on the announcement day given a set of firm and deal information. Acquirers' actual returns are reduced due to the inefficiency factors, such as agency cost in acquirers' management and resistance from targets' management. As a proxy for takeover efficiency, the M&A index is calcuated as a

ratio of acquirers' observed return over the optimal gain on the announcement day and assigned for each takeover deal with a range from 0 to 1. The announcement return reflects the market's response to and expectations regarding a takeover announcement. The smaller gap between acquirers' observed and optimal gain suggests that the market is more optimistic about deal outcomes. By construction, a deal with a higher index value is more efficient than one with a lower index value, and therefore has better deal quality, bearing in mind that due to the restrictions of SFA, the acquisition sample is limited to deals with positive acquirers' return on announcement day.

By examining the relationship between the M&A index and merger outcomes, the empirical results show that takeover deals with higher indices (more efficient deals) are associated with higher probability of deal completion, announcement return and post-acquisition performance in the long run. The findings indicate that higher M&A indices are associated with higher efficiency and better deal quality. Furthermore, this chapter develops the buy-and-hold trading strategy and constructs three portfolios based on different rankings of the M&A index. As a consequence, portfolios with higher M&A indices significantly outperform those with lower indices, especially for the six-month holding period. The most efficient portfolio (with the highest M&A indices) earns 7.89% higher than the least efficient portfolio (with the lowest M&A indices) when holding acquirers' stocks for one month. In addition, monthly alphas for the most efficient portfolio are 11.4% when holding acquirers' stocks for one month after takeover announcement, and this result is robust by using different models.

In a nutshell, this study applies SFA to takeover practice and introduces the M&A

index to measure acquisition efficiency. This study contributes to the current literature by re-evaluating the takeover process and post-acquisition performance with a composite indicator. Due to its significant relationship with takeover outcomes, the M&A index could be used as an effective and forward-looking indicator in the sample with deals with positive acquirers' announcement return for investors to forecast firm performance and design appropriate trading strategies. In academic research, the M&A index can be included in models to gauge the impact of acquisitions. Given that, due to the limitations of stochastic frontier analysis, the acquisition sample only includes deals with positive acquirers' announcement return, the deals selected in our sample are relatively good and efficient compared to the deals with negative acquirer return. Future research could relax the conditions for the M&A index and adjust or change the SFA models to include more takeover samples and expand the application of the index.

Table 2.1 – Estimation of M&A index

Table 2.1 shows the estimation results of the M&A index estimated by the maximum likelihood method (MLE) and ordinary least square (OLS). The table tabulates the coefficient for input variables for production functions in stochastic frontier analysis (SFA). The variables are the same in the ordinary least squares (OLS). Definitions of variables are listed in Appendix A. T-values are shown in the table. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Estimation method	**Stochastic Frontier Analysis (SFA)**	**Ordinary Least Square (OLS)**
Acquirer Tobin's Q	0.0001	0.0001
	(0.86)	(0.67)
Acquirer Leverage	0.0108**	0.0104**
	(2.20)	(2.08)
Acquirer MV	-0.0010**	0.0001
	(-2.03)	(0.08)
Target Tobin's Q	0.0001	0.0001
	(0.82)	(0.60)
Target Leverage	-0.0028	-0.0011
	(-0.67)	(-0.24)
Transaction Value	-0.0037***	-0.0046***
	(-7.25)	(-9.05)
Hostile	-0.0118***	-0.0084**
	(-2.97)	(-2.07)
Tender Offer	0.0229***	0.0222***
	(12.73)	(12.11)
Toehold	-0.0023	-0.0008
	(-1.46)	(-0.51)
Stock	-0.0148**	-0.0157***
	(-8.45)	(-8.77)
Competing	-0.0028	-0.0028
	(-0.78)	(-0.78)
Diversification	-0.0097***	-0.0098***
	(-5.68)	(-5.57)
Constant	0.0483***	0.0235***
	(16.76)	(8.77)
Observation:	6254	6254
Log Likelihood	9527.1399	N/A
Adjusted R-square	N/A	0.0876

Table 2.2 – Descriptive data for M&A index

Table 2.2 lists the descriptive data for the M&A index. Specifically, the table shows the observation (number of M&A indices), mean, median, standard deviation, minimum, quintile and maximum values for M&A indices. We also tabulate the distribution of M&A indices classified by industry and year. The industry classifications are according to the Fama-French 12 industry classifications.

Panel A: M&A index for the full sample

	Observation	Mean	Median	Standard deviation	Min	25%	75%	Max
M&A index	6254	0.9795	0.9814	0.0125	0.6928	0.9786	0.9837	0.9969

Panel B: M&A index classified by year

Year	Observation	Percent	Mean	Median	Standard deviation	Min	25%	75%	Max
1980	4	0.06%	0.9790	0.9781	0.0029	0.9767	0.9768	0.9812	0.9830
1981	25	0.40%	0.9781	0.9796	0.0077	0.9496	0.9768	0.9818	0.9889
1982	46	0.74%	0.9797	0.9804	0.0046	0.9664	0.9772	0.9817	0.9905
1983	86	1.38%	0.9796	0.9804	0.0048	0.9570	0.9782	0.9821	0.9906
1984	206	3.29%	0.9800	0.9814	0.0086	0.9121	0.9787	0.9836	0.9926
1985	97	1.55%	0.9796	0.9809	0.0083	0.9141	0.9783	0.9828	0.9911
1986	98	1.57%	0.9784	0.9808	0.0124	0.8988	0.9778	0.9831	0.9891
1987	136	2.17%	0.9799	0.9816	0.0103	0.8950	0.9786	0.9847	0.9947
1988	143	2.29%	0.9797	0.9810	0.0110	0.8694	0.9784	0.9838	0.9944
1989	163	2.61%	0.9806	0.9813	0.0059	0.9570	0.9784	0.9841	0.9964
1990	153	2.45%	0.9794	0.9810	0.0076	0.9469	0.9780	0.9836	0.9935
1991	113	1.81%	0.9800	0.9813	0.0050	0.9632	0.9777	0.9828	0.9903
1992	98	1.57%	0.9804	0.9819	0.0081	0.9318	0.9786	0.9846	0.9934
1993	134	2.14%	0.9808	0.9821	0.0074	0.9238	0.9795	0.9840	0.9923
1994	304	4.86%	0.9810	0.9817	0.0057	0.9296	0.9789	0.9836	0.9969
1995	331	5.29%	0.9802	0.9812	0.0059	0.9178	0.9785	0.9830	0.9949
1996	401	6.41%	0.9799	0.9812	0.0122	0.7933	0.9790	0.9834	0.9967
1997	370	5.92%	0.9799	0.9814	0.0150	0.7205	0.9789	0.9838	0.9924

1998	406	6.49%	0.9796	0.9813	0.0107	0.8306	0.9783	0.9838	0.9937
1999	421	6.73%	0.9799	0.9817	0.0105	0.8872	0.9784	0.9845	0.9960
2000	471	7.53%	0.9769	0.9816	0.0206	0.6928	0.9776	0.9846	0.9946
2001	274	4.38%	0.9783	0.9810	0.0150	0.8065	0.9778	0.9837	0.9946
2002	147	2.35%	0.9793	0.9808	0.0090	0.9176	0.9768	0.9837	0.9944
2003	193	3.09%	0.9764	0.9808	0.0220	0.8220	0.9773	0.9830	0.9931
2004	194	3.10%	0.9788	0.9810	0.0108	0.8824	0.9787	0.9833	0.9930
2005	177	2.83%	0.9794	0.9817	0.0163	0.8262	0.9797	0.9834	0.9920
2006	187	2.99%	0.9804	0.9820	0.0090	0.9028	0.9796	0.9838	0.9921
2007	196	3.13%	0.9790	0.9817	0.0233	0.7286	0.9796	0.9834	0.9916
2008	163	2.61%	0.9792	0.9810	0.0107	0.8925	0.9781	0.9838	0.9939
2009	112	1.79%	0.9794	0.9807	0.0090	0.9344	0.9774	0.9836	0.9953
2010	136	2.17%	0.9805	0.9816	0.0062	0.9337	0.9785	0.9835	0.9913
2011	131	2.09%	0.9802	0.9819	0.0097	0.9082	0.9796	0.9840	0.9940
2012	138	2.21%	0.9812	0.9824	0.0066	0.9483	0.9797	0.9797	0.9931

Panel C: M&A index classified by industry

Industry	Observation	Percent	Mean	Median	Standard deviation	Min	25%	75%	Max
Consumer Durables	118	1.89%	0.9800	0.9812	0.0102	0.895	0.9812	0.9842	0.9930
Consumer Non-durables	315	5.04%	0.9809	0.9819	0.0074	0.9176	0.9819	0.9842	0.9927
Business Equipment	1203	19.24%	0.9775	0.9815	0.0198	0.6928	0.9815	0.9839	0.9946
Chemical Products	173	2.77%	0.9816	0.9815	0.0039	0.9684	0.9815	0.9845	0.9927
Oil, Gas, and Coal	216	3.45%	0.9768	0.9804	0.0175	0.8262	0.9804	0.9831	0.9924
Healthcare	502	8.03%	0.9785	0.9815	0.014	0.8601	0.9815	0.9838	0.9940
Manufacturing	546	8.73%	0.9792	0.9811	0.0144	0.7808	0.9811	0.9836	0.9930
Finance	1875	29.98%	0.9806	0.9814	0.0059	0.8755	0.9814	0.9832	0.9964
Wholesale and Retail	470	7.52%	0.9799	0.9813	0.0097	0.8851	0.9813	0.9838	0.9969
Telephone and Television	188	3.01%	0.9799	0.9818	0.012	0.8857	0.9818	0.984	0.9953
Utilities	108	1.73%	0.9795	0.9817	0.0111	0.8927	0.9817	0.9833	0.9926
Others	540	8.63%	0.9801	0.9812	0.0082	0.9187	0.9812	0.9843	0.9960

Table 2.3– Descriptive data for firm and deal characteristics

Table 2.3 provides the descriptive statistics of variables for takeover deals in the full sample and the subsample classified by the value of the M&A index. The table lists the mean (number) and standard deviation (percent) of variables (dummy variables) for firm and deal characteristics. The M&A index is the measurement of takeover efficiency, calculated as a ratio of actual acquirers' announcement return over optimal announcement return (estimated by SFA). Definitions of variables are listed in Appendix A. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Variables	Full sample (I)		Low-efficiency deals (II)		High-efficiency deals (III)		Difference
	Mean (Number)	Standard deviation (percent)	Mean (Number)	Standard deviation (percent)	Mean (Number)	Standard deviation (percent)	(III)- (II)
Panel A: Acquirer Related							
Market Value	8562.2610	30415.9600	5410.0420	22071.1100	11713.5800	36652.3800	6303.5330***
Tobin's Q	3.0026	23.9070	2.5716	10.6347	3.4334	32.0883	-0.8618
Leverage	0.1610	0.1705	0.1678	0.1751	0.1542	0.1655	-0.0136***
Return on Assets (ROA)	0.0350	0.1183	0.0308	0.1279	0.0392	0.1077	0.0084***
Panel B: Target Related							
Market Value	2853.0660	15288.8500	1589.5170	9162.8300	4105.3370	19471.0300	2515.8200***
Tobin's Q	2.4153	15.3577	2.1075	6.9847	2.7230	20.5610	0.6155*
Leverage	0.1571	0.1924	0.1603	0.1959	0.1538	0.1888	-0.0065
Return on Assets (ROA)	-0.0120	0.6810	-0.0254	0.9320	0.0015	0.2424	0.0269*
Panel C: Deal Related							
M&A index	0.9795	0.0119	0.9754	0.0153	0.9846	0.0025	0.0093***
Transaction Value (USD millions)	773.5128	3510.8970	709.5833	3661.0230	837.4240	3353.4130	127.8407
Premium (%)	0.1204	1.5178	0.1381	1.9352	0.1026	0.9266	-0.0355
Hostile Takeover	242	3.87%	124	3.97%	118	3.77%	
Tender Offer	1275	20.39%	787	25.17%	488	15.61%	
Toehold	5132	82.06%	2571	82.22%	2561	81.90%	
Competing Bid	288	4.61%	142	4.54%	146	4.67%	
Diversification	1328	21.23%	614	19.64%	714	22.83%	
Cash	4032	64.47%	1975	63.16%	2057	65.78%	
Stock	1292	20.66%	560	17.91%	732	23.41%	
Number of observations	6254		3127		3127		

Table 2.4 – Analysis for probability of deal completion

Table 2.4 presents the analysis for the rate of successful deals. Panel A shows the M&A index for successful and unsuccessful transactions. Panel B tabulates the probit regression results. The dependent variable is the dummy variable which equals 1 when the takeover deal is finally completed and equals 0 when the transactions are failed or withdrawn. The independent variable is the M&A index calculated by stochastic frontier analysis (SFA). All models control the firm and deal characteristics. Definitions of variables are listed in Appendix A. Fixed effects are considered in Model 2 and Model 4, including industry and year fixed effects. Model 3 and Model 4 incorporate acquirer clustering. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Panel A: Univariate analysis

Classification	**Failed (I)**	**Completion (II)**	**Difference (II)-(I)**
Mean	0.9778***	0.9797***	0.0019***
Standard Deviation	0.0211	0.0107	
Observation	775	5479	

Panel B: Multivariate analysis

Completion	Model 1	Model 2	Model 3	Model 4
M&A Index	5.2729***	4.5600***	4.8676***	4.5600***
	(3.53)	(2.98)	(3.08)	(2.83)
Acquirer Tobin's Q	0.0002	0.0003	0.0003	0.0003
	(0.86)	(1.25)	(1.49)	(1.51)
Acquirer Price to Earnings	0.0000	0.0002	0.0001	0.0002
	(-0.04)	(0.44)	(0.64)	(1.01)
Acquirer Leverage	-0.0514	-0.1464	-0.0468	-0.1464
	(-0.55)	(-1.46)	(-0.44)	(-1.33)
Acquirer Cash Flow to Assets	0.1802	0.2475	0.1111	0.2475
	(0.82)	(1.13)	(0.53)	(1.19)
Target Tobin's Q	-0.0029	-0.0018	-0.0029	-0.0018
	(-1.04)	(-0.61)	(-1.31)	(-0.87)
Target Price to Earnings	0.0001	0.0000	0.0000	0.0000
	(0.24)	(0.08)	(0.05)	(0.10)
Target Leverage	0.0094	-0.0166	0.0169	-0.0166
	(0.13)	(-0.22)	(0.18)	(-0.16)
Target Cash Flow to Assets	-0.1156	-0.1013	-0.0902	-0.1013
	(-0.82)	(-0.72)	(-0.67)	(-0.75)
Relative Deal Size	-0.2465***	-0.2439***	-0.2544***	-0.2439***
	(-6.39)	(-6.11)	(-4.77)	(-4.71)
Hostile Takeover	-1.6988***	-1.6977***	-1.7183***	-1.6978***
	(-15.96)	(-15.62)	(-15.58)	(-15.30)
Tender Offer	0.5901***	0.6383***	0.5961***	0.6383***
	(9.03)	(9.41)	(8.04)	(8.54)
Pure Cash Deal	-0.2846***	-0.2833***	-0.2692***	-0.2833***
	(-5.94)	(-5.28)	(-4.68)	(-4.91)
Competing Bid	-0.8927***	-0.9459***	-0.9592***	-0.9459***
	(-9.63)	(-9.84)	(-9.16)	(-9.10)
Diversification	0.0164	0.0315	0.0080	0.0315
	(0.29)	(0.53)	(0.13)	(0.52)
Constant	-3.7407***	-3.3872**	-3.5894**	-3.3872**
	(-2.56)	(-2.25)	(-2.31)	(-2.13)
Year-fixed-effects	No	Yes	Yes	Yes
Industry-fixed-effects	No	Yes	No	Yes
Firm clustering	No	No	Yes	Yes
Observations	6254	6254	6254	6254
Pseudo R2	0.132	0.170	0.163	0.170

Table 2.5 – Analysis for Acquisition premium

Table 2.5 shows analysis of the relationship between acquisition premium and M&A index. In Panel A, the full sample is divided into low-efficiency and high-efficiency subsamples based on the M&A index. Panel A presents the acquisition premium in the low-efficiency and high-efficiency groups. Panel B shows the regression results for acquisition premium. The dependent variable is the acquisition premium, which is defined as the log percentage difference between offer price and target stock price 30 days preceding the announcement date (Baker et al., 2012). The independent variable is the M&A index calculated by stochastic frontier analysis (SFA). All of the models also control firm and deal characteristics. Definitions of variables are listed in Appendix A. Fixed effects are considered in Models 2 and 4, including industry and year fixed effects. Models 3 and 4 incorporate acquirer clustering. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Panel A: Univariate analysis

Acquisition premium	**Low-efficiency (I)**	**High-efficiency (II)**	**Difference (II)-(I)**
Mean	0.1381	0.1026	-0.0355***
Standard Deviation	1.9352	0.9266	
Observation	2889	2881	

Panel B: Multivariate analysis

Acquisition Premium	**Model 1**	**Model 2**	**Model 3**	**Model 4**
M&A Index	-8.9509***	-7.7338***	-8.9509***	-7.7338***
	(-5.80)	(-5.02)	(-5.63)	(-5.02)
Target 52-week High	0.0601***	0.0431***	0.0601***	0.0431***
	(5.33)	(3.64)	(4.65)	(3.47)
Target Market Value	0.2256***	0.2155***	0.2256***	0.2155***
	(19.46)	(17.57)	(16.89)	(14.81)
Acquirer Market Value	-0.3072***	-0.3083***	-0.3072***	-0.3083***
	(-22.20)	(-21.82)	(-21.77)	(-21.64)
Stock	0.4514***	0.4959***	0.4514***	0.4959***
	(10.01)	(10.74)	(9.86)	(10.54)
Toehold	0.0915*	0.0925*	0.0915*	0.0925*
	(1.78)	(1.80)	(1.65)	(1.75)
Competing	0.3791***	0.3502***	0.3791***	0.3502***
	(4.83)	(4.44)	(5.36)	(4.92)
Diversification	0.1614***	0.1182***	0.1614***	0.1182***
	(3.59)	(2.61)	(3.70)	(2.79)
Hostile	0.6547***	0.6249***	0.6547***	0.6249***
	(7.23)	(6.94)	(8.81)	(8.36)
Tender	0.4561***	0.3604***	0.4561***	0.3604***
	(10.46)	(8.04)	(10.90)	(8.91)
Constant	6.9030***	6.1510***	6.9030***	6.1510***
	(4.56)	(4.06)	(4.44)	(4.07)
Year-fixed-effects	No	Yes	Yes	Yes
Industry-fixed-effects	No	Yes	No	Yes
Firm-cluster	No	No	Yes	Yes
Observations	3809	3809	3809	3809
Adjust R2	0.225	0.246	0.225	0.246

Table 2.6 – Analysis for post-acquisition stock performance in the short run

Table 2.6 shows analysis for post-acquisition stock performance in the short run. In Panel A, the full sample is divided into low-efficiency and high-efficiency subsamples based on M&A index. Panel A presents short-run stock performance in the low-efficiency and high-efficiency groups. Panel B shows the regression results for post-acquisition performance in the short run. The dependent variable is the cumulative abnormal return for acquirers over the period 3 days to 5 days after announcement day (ACAR (+3, +5)). The independent variable is the M&A index calculated by stochastic frontier analysis (SFA). All of the models also control firm and deal characteristics. Definitions of variables are listed in Appendix A. Fixed effects are considered in Models 2 and 4, including industry and year fixed effects. Models 3 and 4 incorporate acquirer clustering. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Panel A: Univariate analysis

ACAR (+3,+5)	**Low-efficiency (I)**	**High-efficiency (II)**	**Difference (II)-(I)**
Mean	-0.0582%	0.0563%	0.1145%***
Standard Deviation	0.0424	0.0488	
Observation	3127	3127	

Panel B: Multivariate analysis

ACAR (+3,+5)	Model 1	Model 2	Model 3	Model 4
M&A Index	0.1704***	0.1861***	0.1857*	0.1861*
	(3.64)	(3.95)	(1.65)	(1.66)
Acquirer Tobin's Q	-0.0001	-0.0001	0.0000	0.0000
	(-0.95)	(-0.92)	(-1.64)	(-1.43)
Acquirer Price to Earnings	0.0001	0.0001	0.0000	0.0000
	(0.47)	(0.31)	(0.92)	(0.84)
Acquirer Leverage	0.0002*	0.0002*	0.0002*	0.0002*
	(1.89)	(1.72)	(1.86)	(1.83)
Acquirer Cash Flow to Assets	0.0038*	0.0041*	0.0037	0.0041
	(1.70)	(1.80)	(0.96)	(1.06)
Target Tobin's Q	0.0001	0.0001	0.0001	0.0001
	(0.71)	(0.80)	(0.59)	(0.62)
Target Price to Earnings	-0.0001	-0.0001	0.0000	-0.0000*
	(-1.56)	(-1.51)	(-1.63)	(-1.70)
Target Leverage	-0.0002	-0.0002	-0.0002	-0.0002
	(-0.90)	(-0.93)	(-0.89)	(-0.81)
Target Cash Flow to Assets	-0.0003	-0.0002	-0.0002	-0.0002
	(-0.84)	(-0.76)	(-0.86)	(-0.81)
Relative Deal Size	0.0007	0.0008	0.0007	0.0008
	(1.03)	(1.19)	(0.61)	(0.73)
Hostile Takeover	-0.0053	-0.0056*	-0.0058*	-0.0056*
	(-1.62)	(-1.71)	(-1.91)	(-1.82)
Tender Offer	-0.0008	-0.0010	-0.0012	-0.0010
	(-0.58)	(-0.68)	(-0.86)	(-0.71)
Pure Cash Deal	0.0025**	0.0023*	0.0025*	0.0023*
	(2.11)	(1.81)	(1.87)	(1.70)
Competing Bid	-0.0011	-0.0014	-0.00144	-0.0014
	(-0.39)	(-0.48)	(-0.50)	(-0.49)
Diversification	-0.0033**	-0.0037**	-0.0036**	-0.0037**
	(-2.31)	(-2.53)	(-2.33)	(-2.38)
Constant	-0.1681***	-0.1892***	-0.1860*	-0.1892*
	(-3.67)	(-4.09)	(-1.68)	(-1.71)
Year-fixed-effects	No	Yes	Yes	Yes
Industry-fixed-effects	No	Yes	No	Yes
Firm clustering	No	No	Yes	Yes
Observations	6254	6254	6254	6254
Adjust R2	0.004	0.009	0.009	0.009

Table 2.7 – Analysis for post-acquisition stock performance in medium and long run

Table 2.7 lists the multivariate analysis of stock performance in the medium and long term. Panel A presents acquirers' stock performance for 3 months, 6 months and 9 months after acquisition. Panel B shows the regression results for post-acquisition performance in the long run for 12 months, 24 months and 36 months. The dependent variable is acquirer buy-and-hold returns over the post-acquisition period. The independent variable is the M&A index calculated by stochastic frontier analysis. All of the models also control firm and deal characteristics. Definitions of variables are listed in Appendix A. Fixed effects are considered in Models 2 and 4, including industry and year fixed effects. Models 3 and 4 incorporate acquirer clustering. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Panel A: Stock performance in medium run

	BHAR_3 months				BHAR_6 months			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
M&A Index	0.4791**	0.5358**	0.4791*	0.5358*	0.8306**	0.9128***	0.8306*	0.9128*
	(2.02)	(2.24)	(1.79)	(1.73)	(2.38)	(2.61)	(1.73)	(1.91)
Acquirer Tobin's Q	-0.0000	-0.0000	-0.0000	-0.0000	-0.0001	-0.0001	-0.0001*	-0.0001**
	(-0.43)	(-0.60)	(-0.72)	(-1.02)	(-0.83)	(-1.05)	(-1.68)	(-2.13)
Acquirer Leverage	-0.0059	-0.0044	-0.0059	-0.0044	0.0151	0.0217	0.0151	0.0217
	(-0.43)	(-0.31)	(-0.35)	(-0.26)	(0.74)	(1.03)	(0.65)	(0.94)
Acquirer Cash Flow to Assets	0.0008	0.0069	0.0008	0.0069	-0.0646	-0.0548	-0.0646	-0.0548
	(0.03)	(0.21)	(0.02)	(0.12)	(-1.39)	(-1.15)	(-0.67)	(-0.53)
Target Tobin's Q	-0.0002	-0.0002	-0.0002	-0.0002	-0.0006	-0.0007	-0.0006	-0.0007
	(-0.51)	(-0.63)	(-0.54)	(-0.65)	(-1.31)	(-1.48)	(-1.23)	(-1.36)
Target Leverage	0.0078	0.0103	0.0078	0.0103	-0.0032	0.0006	-0.0032	0.0006
	(0.67)	(0.87)	(0.58)	(0.76)	(-0.18)	(0.03)	(-0.18)	(0.03)
Target Cash Flow to Assets	0.0113	0.0111	0.0113	0.0111	-0.0389*	-0.0383	-0.0389	-0.0383
	(0.71)	(0.67)	(0.42)	(0.40)	(-1.66)	(-1.57)	(-0.95)	(-0.94)
Deal Size	-0.0041***	-0.0030*	-0.0041***	-0.0030*	-0.0071***	-0.0046**	-0.0071***	-0.0046**
	(-2.99)	(-1.91)	(-3.10)	(-1.91)	(-3.54)	(-2.02)	(-3.77)	(-2.02)
Hostile Takeover	-0.0468***	-0.0486***	-0.0468***	-0.0486***	-0.0355	-0.0355	-0.0355	-0.0355

	(-2.87)	(-2.96)	(-2.82)	(-2.91)	(-1.48)	(-1.47)	(-1.40)	(-1.38)
Pure Stock Deal	-0.0218***	-0.0235***	-0.0218**	-0.0235***	-0.0469***	-0.0505***	-0.0469***	-0.0505***
	(-2.81)	(-2.90)	(-2.55)	(-2.67)	(-4.12)	(-4.25)	(-3.95)	(-4.00)
Competing Bid	0.0074	0.0023	0.0074	0.0023	0.0237	0.0143	0.0237	0.0143
	(0.50)	(0.15)	(0.54)	(0.16)	(1.09)	(0.65)	(1.18)	(0.71)
Diversification	-0.0151**	-0.0147*	-0.0151*	-0.0147*	-0.0266**	-0.0260**	-0.0266**	-0.0260**
	(-2.04)	(-1.96)	(-1.83)	(-1.75)	(-2.43)	(-2.34)	(-2.22)	(-2.13)
Tender Offer	-0.0156**	-0.0158**	-0.0156**	-0.0158**	-0.0160	-0.0148	-0.0160	-0.0148
	(-2.07)	(-2.06)	(-2.06)	(-2.04)	(-1.44)	(-1.31)	(-1.32)	(-1.23)
Constant	-0.4416*	-0.5042**	-0.4416	-0.5042	-0.7668**	-0.8850**	-0.7668	-0.8850*
	(-1.90)	(-2.14)	(-1.12)	(-1.29)	(-2.24)	(-2.56)	(-1.63)	(-1.89)
Year-fixed-effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes	No	Yes
Firm-cluster	No	No	Yes	Yes	No	No	Yes	Yes
Observation	6254	6254	6254	6254	6254	6254	6254	6254
Adjusted R-square	0.008	0.011	0.008	0.011	0.011	0.022	0.011	0.022

Panel A: Stock performance in medium run (continued)

	BHAR_9 months			
	Model 1	**Model 2**	**Model 3**	**Model 4**
M&A Index	0.9512**	1.1336**	0.9512*	1.1336**
	(2.08)	(2.48)	(1.73)	(2.06)
Acquirer Tobin's Q	-0.0011*	-0.0011*	-0.0011*	-0.0011*
	(-1.94)	(-1.88)	(-1.90)	(-1.86)
Acquirer Leverage	0.0185	0.0223	0.0185	0.0223
	(0.71)	(0.82)	(0.64)	(0.77)
Acquirer Cash Flow to Assets	0.0477	0.0611	0.0477	0.0611
	(0.80)	(1.00)	(0.46)	(0.57)
Target Tobin's Q	-0.0003	-0.0004	-0.0003	-0.0004

	(-0.42)	(-0.57)	(-0.37)	(-0.48)
Target Leverage	0.0120	0.0152	0.0120	0.0152
	(0.54)	(0.68)	(0.52)	(0.63)
Target Cash Flow to Assets	-0.0699**	-0.0722**	-0.0699	-0.0722
	(-2.31)	(-2.32)	(-1.24)	(-1.26)
Deal Size	-0.0098***	-0.0062**	-0.0098***	-0.0062**
	(-3.77)	(-2.14)	(-4.06)	(-2.15)
Hostile Takeover	-0.0414	-0.0383	-0.0414	-0.0383
	(-1.33)	(-1.23)	(-1.18)	(-1.09)
Pure Stock Deal	-0.0427***	-0.0447***	-0.0427***	-0.0447***
	(-2.90)	(-2.93)	(-2.66)	(-2.65)
Competing Bid	0.0307	0.0162	0.0307	0.0162
	(1.09)	(0.57)	(1.18)	(0.62)
Diversification	-0.0404***	-0.0399***	-0.0404***	-0.0399***
	(-2.87)	(-2.80)	(-2.67)	(-2.60)
Tender Offer	-0.0134	-0.0133	-0.0134	-0.0133
	(-0.93)	(-0.91)	(-0.84)	(-0.84)
Constant	-0.8770*	-1.0868**	-0.8770	-1.0868**
	(-1.96)	(-2.42)	(-1.63)	(-2.02)
Year-fixed-effects	No	Yes	Yes	Yes
Industry-fixed-effects	No	Yes	No	Yes
Firm-cluster	No	No	Yes	Yes
Observation	6254	6254	6254	6254
Adjusted R-square	0.010	0.028	0.010	0.028

Panel B: Stock performance in long run

	BHAR_12 months				BHAR_24 months			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
M&A Index	0.2599	0.6687	0.2599	0.6687	-0.2277	0.3742	-0.2277	0.3742
	(0.51)	(1.32)	(0.43)	(1.17)	(-0.22)	(0.37)	(-0.24)	(0.39)
Acquirer Tobin's Q	-0.0000	-0.0001	-0.0000	-0.0001**	-0.0001	-0.0002	-0.0001	-0.0002*
	(-0.13)	(-0.71)	(-0.46)	(-2.14)	(-0.29)	(-0.79)	(-0.86)	(-1.96)
Acquirer Leverage	0.0120	0.0062	0.0120	0.0062	0.0272	-0.0056	0.0272	-0.0056
	(0.45)	(0.22)	(0.40)	(0.22)	(0.51)	(-0.10)	(0.50)	(-0.12)
Acquirer Cash Flow to Assets	0.1028*	0.1583***	0.1028	0.1583	0.1791	0.2773**	0.1791	0.2773
	(1.72)	(2.65)	(1.02)	(1.47)	(1.52)	(2.34)	(0.86)	(1.24)
Target Tobin's Q	0.0001	-0.0000	0.0001	-0.0000	0.0002	0.0001	0.0002	0.0001
	(0.18)	(-0.01)	(0.15)	(-0.01)	(0.13)	(0.07)	(0.15)	(0.08)
Target Leverage	0.0263	0.0237	0.0263	0.0237	0.0300	0.0182	0.0300	0.0182
	(1.17)	(1.06)	(1.08)	(0.95)	(0.68)	(0.41)	(0.85)	(0.55)
Target Cash Flow to Assets	-0.1121***	-0.1054***	-0.1121**	-0.1054*	-0.1326*	-0.1322*	-0.1326*	-0.1322*
	(-3.22)	(-2.97)	(-1.97)	(-1.86)	(-1.93)	(-1.87)	(-1.75)	(-1.83)
Deal Size	-0.0084***	-0.0057*	-0.0084***	-0.0057*	-0.0151***	-0.0095	-0.0151***	-0.0095*
	(-2.85)	(-1.74)	(-3.09)	(-1.84)	(-2.59)	(-1.47)	(-3.22)	(-1.89)
Hostile Takeover	-0.0536	-0.0525	-0.0536	-0.0525	-0.0707	-0.0592	-0.0707	-0.0592
	(-1.51)	(-1.50)	(-1.61)	(-1.64)	(-1.01)	(-0.85)	(-1.53)	(-1.34)
Pure Stock Deal	-0.0581***	-0.0554***	-0.0581***	-0.0554***	-0.1423***	-0.1512***	-0.1423***	-0.1512***
	(-3.49)	(-3.26)	(-3.12)	(-2.91)	(-4.34)	(-4.47)	(-4.57)	(-4.20)
Competing Bid	0.0088	0.0107	0.0088	0.0107	0.0479	0.0607	0.0479	0.0607
	(0.28)	(0.34)	(0.31)	(0.39)	(0.76)	(0.96)	(1.02)	(1.36)
Diversification	-0.0520***	-0.0480***	-0.0520***	-0.0480***	-0.1134***	-0.1084***	-0.1134***	-0.1084***
	(-3.27)	(-3.02)	(-3.05)	(-2.82)	(-3.62)	(-3.44)	(-4.49)	(-4.20)
Tender Offer	0.0028	0.0089	0.0028	0.0089	0.0141	0.0289	0.0141	0.0289
	(0.17)	(0.55)	(0.17)	(0.54)	(0.44)	(0.90)	(0.45)	(0.89)
Constant	-0.1911	-0.6416	-0.1911	-0.6416	0.3487	-0.3538	0.3487	-0.3538
	(-0.38)	(-1.28)	(-0.33)	(-1.14)	(0.35)	(-0.36)	(0.38)	(-0.38)

Year-fixed-effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes	No	Yes
Firm-cluster	No	No	Yes	Yes	No	No	Yes	Yes
Observation	6254	6254	6254	6254	6254	6254	6254	6254
Adjusted R-square	0.008	0.046	0.008	0.046	0.008	0.031	0.008	0.031

Panel B: Stock performance in long run (Continued)

	BHAR_36 months			
	Model 1	**Model 2**	**Model 3**	**Model 4**
M&A index	-2.5550	-1.9621	-2.5550	-1.9621
	(-1.60)	(-1.63)	(-1.47)	(-1.06)
Acquirer Tobin's Q	-0.0001	-0.0002	-0.0001	-0.0002**
	(-0.29)	(-0.73)	(-1.08)	(-2.21)
Acquirer Leverage	0.0323	-0.0230	0.0323	-0.0230
	(0.51)	(-0.35)	(0.48)	(-0.36)
Acquirer Cash Flow to Assets	0.2813**	0.4226***	0.2813	0.4226
	(1.99)	(2.98)	(1.09)	(1.53)
Target Tobin's Q	-0.0012	-0.0014	-0.0012	-0.0014
	(-0.68)	(-0.78)	(-0.60)	(-0.67)
Target Leverage	0.0687	0.0524	0.0687	0.0524
	(1.29)	(0.99)	(1.45)	(1.19)
Target Cash Flow to Assets	-0.2106**	-0.2097**	-0.2106**	-0.2097**
	(-2.55)	(-2.49)	(-2.03)	(-2.06)
Deal Size	-0.0172**	-0.0099	-0.0172***	-0.0099
	(-2.46)	(-1.28)	(-2.65)	(-1.43)
Hostile Takeover	-0.1039	-0.0850	-0.1039	-0.0850
	(-1.24)	(-1.02)	(-1.56)	(-1.31)
Pure Stock Deal	-0.1528***	-0.1827***	-0.1528***	-0.1827***
	(-3.88)	(-4.52)	(-3.64)	(-4.02)
Competing Bid	0.0235	0.0461	0.0235	0.0461

	(0.31)	(0.61)	(0.40)	(0.81)
Diversification	-0.1516***	-0.1507***	-0.1516***	-0.1507***
	(-4.02)	(-4.00)	(-4.64)	(-4.50)
Tender Offer	-0.0003	0.0112	-0.0003	0.0112
	(-0.01)	(0.29)	(-0.01)	(0.28)
Constant	2.6589**	1.9653*	2.6589	1.9653
	(2.23)	(1.65)	(1.56)	(1.08)
Year-fixed-effects	No	Yes	Yes	Yes
Industry-fixed-effects	No	Yes	No	Yes
Firm-cluster	No	No	Yes	Yes
Observation	6254	6254	6254	6254
Adjusted R-square	0.009	0.041	0.009	0.041

Table 2.8 – Long-run operating performance

Table 2.8 reports the relationship between the M&A index and long-run operating performance after acquisitions. The dependent variable is the average industry-adjusted ROA of acquirers for three years post-acquisition (IAROA). IAROA is bidder's return on assets, deducting the median ROA in the industry with the same first two-digit SIC code as the acquirers. The independent variable is the M&A index calculated by stochastic frontier analysis (SFA). All of the models also control firm and deal characteristics. Definitions of variables are listed in Appendix A. Fixed effects are considered in Models 2 and 4, including industry and year fixed effects. Models 3 and 4 incorporate acquirer clustering. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Average 3-year IAROA	Model 1	Model 2	Model 3	Model 4
M&A index	1.4712***	1.2641***	1.2724***	1.2641***
	(3.18)	(2.72)	(3.60)	(3.57)
Acquirer Tobin's Q	-0.0001	0.0001	0.0000	0.0001
	(-0.14)	(0.49)	(1.00)	(1.33)
Acquirer Price to Earnings	-0.0001	-0.0001	0.0000	0.0000
	(-0.47)	(-0.45)	(-0.69)	(-0.77)
Acquirer Leverage	0.0546**	0.0591**	0.0632**	0.0591*
	(2.33)	(2.42)	(2.16)	(1.85)
Acquirer Cash Flow to Assets	0.3650***	0.3586***	0.3519***	0.3586***
	(6.74)	(6.49)	(4.55)	(4.69)
Target Tobin's Q	-0.0001	0.0001	0.0001	0.0001
	(-0.02)	(0.21)	(0.11)	(0.22)
Target Price to Earnings	0.0001	0.0002	0.0000	0.0000
	(0.38)	(0.30)	(0.78)	(0.68)
Target Leverage	0.0207	0.0236	0.0241*	0.0236
	(1.06)	(1.20)	(1.73)	(1.48)
Target Cash Flow to Assets	0.0665**	0.0765**	0.0707**	0.0765**
	(2.07)	(2.31)	(2.02)	(2.25)
Relative Deal Size	-0.0091	-0.0073	-0.0092*	-0.0073
	(-1.37)	(-1.09)	(-1.85)	(-1.45)
Hostile Takeover	0.0048	0.0011	0.0000	0.0011
	(0.15)	(0.03)	(-0.00)	(0.11)
Tender Offer	0.0118	0.0114	0.0094	0.0114
	(0.85)	(0.80)	(0.78)	(0.84)
Pure Cash Deal	0.0149	0.0215*	0.02175**	0.0215***
	(1.31)	(1.72)	(2.37)	(2.77)
Competing Bid	0.0110	0.0102	0.0112	0.0102
	(0.39)	(0.36)	(0.78)	(0.71)
Diversification	0.0051	0.0062	0.0057	0.0062
	(0.37)	(0.44)	(0.73)	(0.86)
Constant	-2.153***	-1.9785***	-1.9812***	-1.9785***
	(-4.75)	(-4.33)	(-5.61)	(-5.60)
Year-fixed-effects	No	Yes	Yes	Yes
Industry-fixed-effects	No	Yes	No	Yes
Firm clustering	No	No	Yes	Yes
Observations	6254	6254	6254	6254
Adjust R2	0.016	0.026	0.024	0.026

Table 2.9 – Trading strategy

Table 2.9 shows the holding period return in Panel A and monthly alpha in Panel B for trading strategies with the M&A index. The full sample is split into three portfolios on the basis of the M&A index of each deal. Portfolio 1 is the group with the lowest indices, which is the portfolio with inefficient deals. Portfolio 3 is the group with the highest indices, which is a portfolio with efficient deals. Portfolio 2 is the group with neutral indices. To avoid large movements in acquirers' stocks due to the takeover announcement, we exclude the date announced and start to hold stocks from the day after the takeover announcement. Panel A reports the average holding period return over 1 to 6 months after the announcement day and the mean difference between the two portfolios. To calculate the monthly alpha, we adopt four models for benchmarking, including CAPM, the Fama-French three factors, Fama-French four factors and Fama-French five factors. Panel B shows the monthly alpha for portfolios over different holding periods and the difference between each of the two groups. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Panel A: Holding period return

Holding Period Return	Portfolio (least efficient) (I)	Portfolio (medium efficient) (II)	Portfolio (most efficient) (III)	Difference (II)-(I)	Difference (III)-(II)	Difference (III)- (I)
Holding 1 month	-0.0184***	0.0207***	0.0604***	0.0391***	0.0397***	0.0789***
Holding 2 months	-0.0082***	0.0308***	0.0676***	0.0390***	0.0369***	0.0759***
Holding 3 months	0.0067***	0.0446***	0.0797***	0.0380***	0.0351***	0.0731***
Holding 4 months	0.0067***	0.0510***	0.0864***	0.0442***	0.0354***	0.0796***
Holding 5 months	0.0299***	0.0736***	0.0969***	0.0437***	0.0233***	0.0670***
Holding 6 months	0.0365***	0.0839***	0.1057***	0.0474***	0.0217**	0.0692***
Observation	2085	2085	2084			

Panel B: Monthly alpha for various models

Monthly Alpha	Model	Portfolio (least efficient) (I)	Portfolio (Medium efficient) (II)	Portfolio (most efficient) (III)	Difference (II)-(I)	Difference (III)-(II)	Difference (III)- (I)
Holding 1 month	Alpha_CAPM	0.0264***	0.0451***	0.1173***	0.0187***	0.0721***	0.0908***
	Alpha_FF3	0.0205***	0.0459***	0.1141***	0.0254***	0.0682***	0.0936***
	Alpha_FF4	0.0202***	0.0474***	0.1172***	0.0272***	0.0698***	0.0970***
	Alpha_FF5	-0.3937***	-0.3715***	-0.3407***	0.0222***	0.0308***	0.0531***
Holding 2 months	Alpha_CAPM	0.0131***	0.0203***	0.0444***	0.0072***	0.0241***	0.0313***
	Alpha_FF3	0.0074***	0.0175***	0.0434***	0.0101***	0.0259***	0.0360***
	Alpha_FF4	0.0086***	0.0193***	0.0410***	0.0107***	0.0217***	0.0324***
	Alpha_FF5	-0.3885***	-0.3709***	-0.3481***	0.0176***	0.0229***	0.0404***
Holding 3 months	Alpha_CAPM	0.0038***	0.0101***	0.0250***	0.0063***	0.0149***	0.0212***
	Alpha_FF3	-0.0001***	0.0085***	0.0249***	0.0086***	0.0164***	0.0250***
	Alpha_FF4	0.0008***	0.0100***	0.0229***	0.0091***	0.0129***	0.0220***
	Alpha_FF5	-0.3851***	-0.3708***	-0.3497***	0.0142***	0.0212***	0.0354***
Holding 4 months	Alpha_CAPM	0.0009***	0.0062***	0.0170***	0.0053***	0.0108***	0.0161***
	Alpha_FF3	-0.0021***	0.0051***	0.0171***	0.0072***	0.0120***	0.0192***
	Alpha_FF4	-0.0013***	0.0063***	0.0154***	0.0077***	0.0091***	0.0167***
	Alpha_FF5	-0.3816***	-0.3707***	-0.3502***	0.0109***	0.0206***	0.0315***
Holding 5 months	Alpha_CAPM	-0.0002***	0.0043***	0.0127***	0.0045***	0.0084***	0.0130***
	Alpha_FF3	-0.0027***	0.0035***	0.0129***	0.0062***	0.0094***	0.0156***
	Alpha_FF4	-0.0021***	0.0045***	0.0114***	0.0066***	0.0069***	0.0135***
	Alpha_FF5	-0.3795***	-0.3699***	-0.3515***	0.0096***	0.0184***	0.0280***
Holding 6 months	Alpha_CAPM	-0.0007***	0.0032***	0.0101***	0.0039***	0.0069***	0.0109***
	Alpha_FF3	-0.0028***	0.0026***	0.0103***	0.0054***	0.0078***	0.0132***
	Alpha_FF4	-0.0023***	0.0034***	0.0090***	0.0057***	0.0056***	0.0113***
	Alpha_FF5	-0.3774***	-0.3683***	-0.3509***	0.0091***	0.0174***	0.0265***
Observation		2085	2085	2084			

Table 2.10 – Trading strategy classified by industry

Table 2.10 shows a holding period return in Panel A and monthly alpha in Panel B for trading strategies with the M&A index, classified by industry. The full sample is split into three portfolios on the basis of the M&A index of each deal. Portfolio 1 is the group with the lowest indices, which is the portfolio with inefficient deals. Portfolio 3 is the group with the highest indices, which is the portfolio with efficient deals. Portfolio 2 is the group with neutral indices. To avoid large movements in acquirers stocks due to takeover announcement, we exclude the date announced and start to hold stocks from the day after the takeover announcement. Panel A reports the average holding period return over 1 to 6 months after the announcement day and the mean difference between the two portfolios. To calculate the monthly alpha, we adopt four models for benchmarking, including the CAPM, Fama-French three factors, Fama-French four factors and Fama-French five factors. Panel B shows the monthly alpha for portfolios over different holding periods and the difference between the two groups. The industry classifications are according to the Fama-French 12 industry classifications. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Panel A: Holding period return

Holding Period Return for Industry	Portfolio (least efficient) (I)	Portfolio (medium efficient) (II)	Portfolio (most efficient) (III)	Difference (II)-(I)	Difference (III)-(II)	Difference (III)- (I)
Telephone and Television	-0.0607***	0.0254***	0.0731***	0.0861***	0.0477	0.1338***
observation	78	77	75			
Oil, Gas, and Coal	-0.0843***	0.0350***	0.0500***	0.1193***	0.015	0.1343***
observation	84	82	81			
Consumer Durables	-0.0184***	0.0207***	0.0604***	0.0288	0.0732**	0.1020***
observation	54	52	58			
Business Equipment	-0.0333***	0.0165***	0.0639***	0.0498***	0.0475***	0.0972***
observation	388	380	381			
Manufacturing	-0.0115***	0.0244***	0.0612***	0.0359***	0.0369***	0.0727***
observation	173	172	170			
Chemicals Products	-0.0264***	0.0189***	0.0618***	0.0453**	0.0429**	0.0882***
observation	70	68	73			
Consumer Non-Durables	-0.0071***	0.0201***	0.0734***	0.0273	0.0533***	0.0805***
observation	103	99	105			
Healthcare	-0.0284***	0.0173***	0.0584***	0.0457***	0.0411***	0.0868***
observation	168	174	165			
Wholesale and Retail	0.0057***	0.0278***	0.0821***	0.022	0.0544***	0.0764***
observation	163	166	164			
Finance	-0.0058***	0.0170***	0.0440***	0.0228***	0.0271***	0.0498***
observation	576	589	594			
Utilities	-0.0094***	0.0154***	0.0294***	0.0249	0.014	0.0389**
observation	51	59	57			
Other	-0.0174***	0.0322***	0.0868***	0.0497***	0.0546***	0.1042***
observation	177	179	181			

Panel B: Monthly alpha

Monthly alpha for Industry	Portfolio (least efficient) (I)	Portfolio (medium efficient) (II)	Portfolio (most efficient) (III)	Difference (II)-(I)	Difference (III)-(II)	Difference (III)- (I)
Telephone and Television	-0.2987***	0.0806***	0.0306***	0.3794***	-0.0501***	0.3293***
observation	78	77	75			
Oil, Gas, and Coal	-0.1771***	0.0296***	-0.1111***	0.2067***	-0.1406***	0.0661***
observation	84	82	81			
Consumer Durables	0.0097***	-0.0522***	0.0251***	-0.0619***	0.0773***	0.0154**
observation	54	52	58			
Business Equipment	0.0547***	0.0795***	0.1231***	0.0248***	0.0435***	0.0683***
observation	388	380	381			
Manufacturing	-0.0194***	0.0191***	0.1379***	0.0385***	0.1188***	0.1573***
observation	173	172	170			
Chemicals Products	0.0102***	0.0765***	0.0942***	0.0663***	0.0177***	0.0840***
observation	70	68	73			
Consumer Non-Durables	-0.0628***	-0.0531***	0.1320***	0.0097**	0.1851***	0.1948***
observation	103	99	105			
Healthcare	-0.0056***	0.0456***	0.1530***	0.0512***	0.1075***	0.1587***
observation	168	174	165			
Wholesale and Retail	-0.0312***	0.0049***	0.1757***	0.0361***	0.0544***	0.2068***
observation	163	166	164			
Finance	0.0970***	0.0662***	0.1315***	-0.0309***	0.0654***	0.0345***
observation	576	589	594			
Utilities	0.0999***	0.0154***	-0.0569***	0.0383***	-0.1952***	-0.1568***
observation	51	59	57			
Other	0.0056***	0.0270***	0.1137***	0.0214***	0.0867***	0.1081***
observation	177	179	181			

Table 2.11 – Trading strategy classified by year

Table 2.11 shows holding period returns in Panel A and monthly alpha figures in Panel B for a trading strategy with the M&A index, classified by industry. The full sample is split into three portfolios on the basis of the M&A index of each deal. Portfolio 1 is the group with lowest indices, which is the portfolio with inefficient deals. Portfolio 3 is the group with highest indices, which is the portfolio with efficient deals. Portfolio 2 is the group with neutral indices. To avoid large movements in acquirer stocks due to takeover announcements, we exclude the announcement date and start to hold stocks from the day after the announcement. Panel A reports the average holding period return over 1 to 6 months after the announcement date and the mean difference between the two portfolios. To calculate the monthly alpha, we adopt four models for benchmarking, including the CAPM, Fama-French three factors, Fama-French four factors and Fama-French five factors. Panel B shows the monthly alpha for portfolios over different holding periods and the difference between each group. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Panel A: Holding period return

Holding Period Return for year	Portfolio (least efficient) (I)	Portfolio (medium efficient) (II)	Portfolio (most efficient) (III)	Difference (II)-(I)	Difference (III)-(II)	Difference (III)- (I)
1980-1984	-0.0215***	-0.0095***	0.0732***	0.0121	0.0826***	0.0947***
observation	98	93	85			
1985-1989	-0.0262***	0.0246***	0.0702***	0.0508***	0.0456***	0.0964***
observation	204	202	206			
1990-1994	-0.0104***	0.0107***	0.0624***	0.0211*	0.0517***	0.0728***
observation	273	264	263			
1995-1999	-0.0112***	0.0248***	0.0556***	0.0360***	0.0308***	0.0668***
observation	621	636	626			
2000-2004	-0.0202***	0.0344***	0.0644***	0.0546	0.0300***	0.0846***
observation	441	440	448			
2005-2009	-0.0333***	0.0059***	0.0489***	0.0386***	0.0430***	0.0816***
observation	289	295	293			
2010-2012	-0.0148***	0.0191***	0.0642***	0.0339***	0.0450***	0.0789***
observation	159	154	163			

Panel B: Monthly alpha

Monthly alpha for year	Portfolio (least efficient) (I)	Portfolio (medium efficient) (II)	Portfolio (most efficient) (III)	Difference (II)-(I)	Difference (III)-(II)	Difference (III)- (I)
1980-1984	-0.0384***	0.0521***	0.1448***	0.0906***	0.0927***	0.1833***
observation	98	93	85			
1985-1989	0.0159***	0.0198***	0.1199***	0.0039	0.1001***	0.1040***
observation	204	202	206			
1990-1994	0.0422***	0.0642***	0.1716***	0.0220***	0.1074***	0.1294***
observation	273	264	263			
1995-1999	0.0367***	0.0375***	0.0900***	0.0009	0.0525***	0.0533***
observation	621	636	626			
2000-2004	0.0518***	0.1128***	0.1719***	0.0610***	0.0591***	0.1210***
observation	441	440	448			
2005-2009	-0.0624***	0.0229***	0.0353***	0.0852***	0.0124***	0.0976***
observation	289	295	293			
2010-2012	0.0287***	-0.0129***	0.1168***	-0.0416***	0.1297***	0.0881***
observation	159	154	163			

Table 2.12 – Inefficiency in takeover transactions

Table 2.12 analyses what the M&A index captures. Panel A divides the full sample based on the E-index and shows the M&A index for the subsamples. Panel B examines what the M&A index captures. The dependent variable is the M&A index calculated by stochastic frontier analysis (SFA). The independent variable is the E-index. The entrenchment index (E-index; (Bebchuk et al., 2009)) is constructed manually based on the six provisions of Corporate Takeover Defenses released by the IRRC (Investor Responsibility Research Center). Bebchuk et al. (2009) find that firms with a higher E-index are associated with lower firm value and stock returns, implying that firms with a higher E-index may suffer higher agency cost. All models control the firm and deal characteristics. Definitions of variables are listed in Appendix A. Fixed effects are considered in Models 2 and 4, including industry and year fixed effects. Models 3 and 4 incorporate acquirer clustering. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Panel A: Univariate analysis

M&A index	**Low-E-index (I)**	**High-E-index (II)**	**Difference (II)-(I)**
Mean	0.9815	0.9796	-0.0019***
Standard Deviation	0.0004	0.0005	
Observation	298	691	

Panel B: Multivariate analysis

M&A index	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Entrenchment Index	-0.0017**	-0.0018**	-0.0017**	-0.0018**
	(-2.22)	(-2.23)	(-2.05)	(-2.09)
Premium	-0.0014***	-0.0011***	-0.0014***	-0.0011***
	(-4.09)	(-3.41)	(-4.07)	(-3.34)
Relative Target Size	-0.0027*	-0.0027	-0.0027*	-0.0027
	(-1.74)	(-1.62)	(-1.73)	(-1.60)
Competing Bid	-0.0028	-0.0025	-0.0028	-0.0025
	(-1.10)	(-0.97)	(-1.11)	(-0.97)
Diversification	0.00102	0.001	0.0010	0.0010
	(0.93)	(0.86)	(0.90)	(0.84)
Pure Cash Deal	0.0019**	0.0021**	0.0019**	0.0021**
	(2.05)	(2.24)	(2.00)	(2.17)
Constant	0.9807***	0.9811***	0.9807***	0.9811***
	(692.93)	(407.79)	(620.92)	(389.58)
Year-fixed-effects	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes
Observations	989	989	989	989
Adjust R2	0.035	0.035	0.035	0.044

2.8 Appendix A

Variables	Definitions
	Panel A: Key independent variables
M&A Index	M&A index is the measurement of takeover efficiency, calculated as a ratio of actual acquirers' announcement return over optimal acquirers' announcement return (estimated by Stochastic Frontier Analysis).
	Panel B: Post-acquisition performance
ACAR (+3,+5)	ACAR (+3, +5) refers to the cumulative abnormal return for acquirers over the period 3 days to 5 days after announcement day. This variable is calculated by the market model (Brown and Warner, 1985) with the value-weighted CRSP index as a benchmark for market return and an estimation period starting 200 trading days and ending 20 trading days before the M&A deal announcement.
Industry-adjusted Return on Assets of Acquirer (A_IAROA)	A_ IAROA is bidder's return on assets (ROA), deducting median ROA in the industry with the same first two-digit SIC code as the acquirers'.
	Panel C: Firm characteristics
Tobin's Q	Tobin's Q is computed as the ratio of the market value of a firm to the book value of its assets.
Market Value (MV)	The market value is calculated as the number of shares outstanding multiplied by the respective stock price at four weeks before the official deal announcement.
Leverage	Leverage ratio is total debt, which is the sum of a firm's long-term debt and short-term debt, divided by its total assets.
Return on Assets (ROA)	ROA is computed as the ratio of the company's net income by the book value of its total assets.
Price to Earnings	Price to earnings is calculated as the share price four weeks before the announcement divided by earnings per share excluding extraordinary items.
Cash Flow to Assets	Cash flow to assets is a ratio of cash flow over total assets. Cash flow is operating income before extraordinary items, adding depreciation and subtracting dividends paid to shareholders.
Target 52-week High	The target 52-week high is defined as the log percentage difference of the target highest price during the 52 weeks before the date announced over the target share price four weeks before the M&A deal announcement (Baker et al., 2012).
	Panel D: Deal characteristics
Transaction Value (USD millions)	Transaction value refers to the total value of consideration paid by the acquirer in order to obtain the target. We report the total dollar value as reported by Thomson One.

Premium (%)	Premium is defined as the offer price, as the log percentage difference from target's share price four weeks before the M&A deal announcement (Baker et al., 2012).
Relative Deal Size	Relative deal size is computed as the transaction value divided by the market capitalisation of the acquirer four weeks before the official deal announcement.
Hostile Takeover	Dummy variable that equals 1 if the M&A deal is reported as hostile.
Tender Offer	Dummy variable that equals 1 when the acquisition is reported as a tender offer.
Toehold	Dummy variable that equals 1 when bidder owns target shares before takeover transaction.
Competing Bid	Dummy variable that equals 1 if the M&A deal involves multiple bidders.
Cash	Dummy variable that equals 1 if the M&A deal is paid fully with cash.
Stock	Dummy variable that equals 1 if the M&A deal is paid fully with stock.
Diversification	Dummy variable that equals 1 when the first two digits of the acquirer SIC are different from the first two digits of the target SIC.

Chapter 3: Social Connections, Reference Points and Acquisition Premium

3.1 Introduction

This chapter introduces the social network theory into M&A studies and investigates the impact of social connections on takeover activities. Specifically, this chapter examines whether and how acquisition premium is affected by social linkage between acquirers and targets.

Social network studies have attracted considerable interest from researchers and are increasingly applied to the area of corporate finance. Previous literature shows that social connections matter for firm performance and corporate decisions (Cohen et al., 2008; Cooney et al., 2015; Engelberg et al., 2012; Hochberg et al., 2007; Mol, 2001; Myers & Majluf, 1984; Schoorman et al., 1981; Uzzi, 1999; Wasserman & Faust, 1994). Firms with social connections mainly benefit from improvement in information. Social connection facilitates information-transferring between connected partners, and therefore reduces the cost of obtaining and processing information. In addition, social connections build trust beyond transactions and lead to familiarity bias as well as social conformity (Ishii & Xuan, 2014). As a consequence, firms tend to involve connected partners in their business. On the one hand, social connection improves firm performance and investment decisions due to enhanced information advantage. On the other hand, firms may lock connected partners in and neglect more favourable opportunities and outcomes.

Recently, a growing body of literature has introduced the social network theory into

M&A studies and explored the impact of social connection on takeover outcomes. These studies emphasise the social ties between acquirers and targets and find mixed results in terms of the effects of social connection. On the one hand, acquirers with a social connection benefit from an information advantage and are better able to determine their targets' true value. Therefore, acquirers connected with target firms have greater bargaining power and can therefore negotiate better deal items in takeover bids (Cai & Sevilir, 2012; Mol, 2001; Myers & Majluf, 1984; Schoorman et al., 1981). On the other hand, social connection could raise issues (Ishii & Xuan, 2014), such as overtrust or familiarity bias (Cao, Han, Hirshleifer, & Zhang, 2009), social conformity (Cialdini & Goldstein, 2004) and overconfidence of acquirer management (Roll, 1986), therefore increasing the likelihood of overpayment and leading to inefficient and unprofitable transactions.

Motivated by the conflicting results, this chapter re-examines the social linkage between acquirers and targets and provides further evidence for the role of social connection in the takeover process and in acquisition performance. Specifically, this study concentrates on the relationship between acquirer-target connection and acquisition premium, which is defined as the offer price, as the log percentage difference from the target's share price four weeks before the M&A deal announcement (Baker et al., 2012). Additionally, this study investigates acquisition timing and the medium of payment as alternative evidence to explain the relationship between acquisition premium and social connection.

Previous studies indicate that a premium is not only an important measurement for the market to evaluate takeover transactions for bidders and targets but also strongly influences merging firms' financial situations and post-acquisition performance in

the short and even the long term (Alexandridis et al., 2013; Alexandridis, Mavrovitis, & Travlos, 2012; Ayers, Lefanowicz, & Robinson, 2003; Holmén, Nivorozhkin, & Rana, 2014; Schwert, 1996). More importantly, acquisition premium is directly and largely affected by the acquirer-target connection among the indicators for takeover outcomes since the premium best reflects the information advantage and bargaining power in the negotiations between acquirers and their targets. Hence, premium analysis could better verify the information hypothesis of social network studies.

In addition, this chapter introduces a psychological reference point (Baker et al., 2012) to examine what plays a determining role in target valuation and bid premium. According to Baker et al. (2012), both acquirers and targets regard a target's 52-week high as a psychological reference point for target valuation and rely heavily on this psychological anchor when negotiating their offer premium. The target 52-week high is defined as the target's highest stock price over the period from 365 days before to 30 days before the takeover announcement, denoted as the log percentage difference of the target stock price 30 days before the takeover announcement. A higher target 52-week high implies a higher bid premium, therefore increasing the possibility of overpayment. Such a significant and positive relationship has been widely confirmed by recent studies (Alexandridis et al., 2013; Betton et al., 2014). The target 52-week high is an important anchor for acquisition partners to value target firms and negotiate offer prices while acquirers with social connection may better acknowledge the true value of their target firm through personal networks and therefore have larger bargaining power during negotiations. By involving the reference point theory (Baker et al., 2012) as an additional testing framework, this study could better investigate whether acquisition premium is more affected by the acquirer's social network or a psychological anchor.

In this chapter, two types of cross-firm connections are defined based on the BoardEx database: first-degree and second-degree connection. A first-degree connection refers to a situation in which a board director or executive serves on both acquiring and target firm boards during the deal announcement period, while a second-degree connection is defined when two individuals, respectively from the acquirer and the target firm, have social ties through past experience (such as employment history or educational background).

To test the impact of social connection, this chapter uses a sample of 1,072 US M&A deals announced between January 1, 2001, and December 31, 2012, among which 11.94% of all takeover transactions are connected on either a first-degree or second-degree basis, or both. In the univariate analysis, the existence of social connection reduces the premium by 5.54% relative to non-connected transactions. Especially in first-degree connected deals, acquiring firms pay on average 25.59% to targets, which is 16.98% less than the premium paid in takeovers with no connection. Next, this study introduces a reference point – target 52-week high – in the premium analysis. The average target 52-week high reference point is 2.40% higher in deals with a first-degree connection than in non-connected acquisitions. According to the reference point theory (Baker et al., 2012), a higher target 52-week high point implies a higher bid premium. Therefore, theoretically, first-degree connected deals are associated with a higher premium. In fact, however, the acquisition premium is 16.98% less in first-degree connected transactions. Moreover, the full sample is divided into three groups based on the target 52-week reference point (low, medium, high). In the group with a low target 52-week reference point, acquirers with a first-degree connection paid 15.27% less than firms without a connection. The difference of premium is 36.64% between first-degree connected deals and

non-connected ones.

These findings are further supported in the multivariate analysis. As a consequence, acquisition premium is negatively affected by social connection, particularly first-degree connection. The coefficients of first-degree connection are statistically significant at the 1% level, even with a target 52-week high controlled. When the sample is limited to connected deals, the strong and negative relationship remains between first-degree connection and premium while no significant relationship is observed between the target 52-week reference point and premium. The empirical results provide evidence to support the information hypothesis, which indicates that social connection facilitates information exchange and reduces information asymmetry between acquirers and targets. Therefore, acquiring firms that are socially linked to their targets are better able to estimate such targets' true value and improve their own bargaining power, therefore paying lower acquisition premiums. In particular, this information advantage is strengthened for bidders with a first-degree connection, since acquirers would have better communication during negotiations, helping them to secure a much lower and more favourable offer premium. Furthermore, offer premium is not affected by a psychological reference point in the deal in which acquirers and targets are closely connected. Therefore, information advantage in social connection outweighs the reference point for acquisition partners and mainly determines the acquisition premium.

The empirical results in the premium analysis imply that an acquirer-target connection benefits acquirers through a significantly lower premium. In addition, target firms with social ties are willing to accept less favourable deal items. This chapter then explores why social connection favours acquirers over targets by

examining pre-takeover board positions and post-takeover retention of connected directors. In first-degree connected deals, all connected directors remain seated in combined firms following acquisition. 29.27% of interlocking directors are recruited as the CEO or Chairman in acquirers while serving as independent or common directors in targets. These directors obtain more benefit and power from acquiring firms, therefore serving acquirers' interests and resulting in significantly lower premia (11.49%). Acquisitions (60.98%) in which connected directors hold equivalent level positions in both the bidder and the target firm are associated with an average 17.62% premium – significantly lower than 88.76% premium in deals where directors hold higher positions in targets. This finding can be attributed to the larger relative acquirer size in deals where directors serve as same-level board members in acquisition partners. According to Ferris et al. (2003), directors in larger firms are more likely to receive board seats from outside firms. Meanwhile, external directorship provides directors with additional financial benefits, information and network sources. Therefore, connected directors have a self-incentive to assist with the completion of takeover deals and remain in the combined firm with a larger size. In deals with second-degree connections, acquirers that recruit connected target directors in the new board are more likely to pay a lower premium as a board seat in the combined firm is secured. Moreover, a board seat in combined firms certifies target directors' quality and attracts directorship invitation from outside firms (Harford, 2003; H. Wang et al., 2010). Hence, target connected directors have strong self-incentive to accelerate the acquisition process and compromise on lower acquisition premium, resulting in deviation from target shareholders' interest.

For robustness check, social connections are reclassified according to CEO connections, in which either the acquirer or target CEOs connect the two merging

firms. Based on this definition, CEO connection is subdivided into CEO first-degree connection and CEO second-degree connection. Consequently, CEO connection (22.50% premium), and especially first-degree CEO connection (17.92% premium), significantly reduces the premium paid by acquirers. This finding can be attributed to more accurate information provided by target CEOs and their powerful role in decision-making, therefore providing further evidence to support the information hypothesis of social connection.

Furthermore, acquirers could benefit from social connections by selecting favourable acquisition timing and method of payment as well as paying a lower premium. The results show that connected deals are more likely to be undertaken when acquirers' stocks are overvalued. Bidders in connected transactions are prone to finance acquisitions with their overvalued stock. To some extent, the choice of takeover timing and payment method mitigate the actual value paid to targets. According to Fu et al. (2013), targets have an incentive to request a high premium when acquirers choose to pay for a deal with overvalued stock. However, targets with social ties are more likely to accept a takeover bid that is favourable to their acquirers. Therefore, acquisition timing and payment method also reflect the benefit of social connection for acquirers.

This chapter contributes to the current literature in several ways. First, this study provides further evidence of social ties between acquirers and targets and verifies the information hypothesis in cross-firm connections while previous studies have drawn ambivalent conclusions regarding the impact of social connections on takeover activities. Unlike Cai and Sevilir (2012), who provide similar evidence, this chapter emphasises premium analysis and introduces the target 52-week high point, which is

an important psychological anchor for both acquirers and targets to price the target during negotiation (Baker et al., 2012). The empirical results show that target valuation and offer premium depend on the firm's previous stock performance, operating and financial situation but are also largely affected by the invisible relations between acquirers and targets. Especially in first-degree connected deals, social connection significantly enhances acquirers' bargaining power in negotiations and has a larger influence on the premium paid than the reference point. The information advantage outweighs the psychological reference point and is the main determinant of the acquisition premium.

Another contribution is related to acquisition timing and method of payment. Few studies have considered the impact of social connection on the choice of takeover timing and payment method. In addition to Rhodes–Kropf, Robinson, and Viswanathan (2005) theoretical explanation of why targets accept bidders' overvalued equity, the results show that the close bidder-target relationship plays an important role in explaining this fact. Renneboog and Zhao (2014) use a UK sample and demonstrate that connected deals are more likely to be paid with stocks, attributed to the board effect. This study employs a US sample and enriches the view by analysing the pre-announcement stock performance of both acquirers and targets.

This chapter further contributes to the studies on corporate governance and directorship. The empirical results indicate that acquirer-target connections favour bidding firms over target firms and connected target firms are willing to accept less favourable deal items due to their self-interest. First degree-connected directors offer lower premiums if they hold more senior positions in the acquiring firms. In second degree-connected deals, a lower premium is offered to target firms if the target

director is retained in the new board of the merged entity. These results support the previous findings (Harford, 2003; H. Wang et al., 2010) that target directors would take priority of self-interest and compromise on acquisition premium at the cost of the targets' shareholders' interests in order to obtain a directorship in the combined firms.

This chapter is structured as follows. Section 3.2 reviews the related literature; section 3.3 develops our hypotheses; Section 3.4 describes the data and methodological approach used; Section 3.5 presents the empirical results and the interpretation of the results. Finally, section 3.6 concludes the research.

3.2 Literature review

3.2.1 Measurement of Social Connections

The definition of social connection has varied in recent research, leading to different outcomes. El-Khatib, Fogel, and Jandik (2015) adopt the CEO centrality factor to study the relationship between acquisitions and within-firm social connection. CEO centrality qualifies the strength and importance of the CEO within the top management in terms of performance, decision-making and dedication. Higher CEO centrality implies that the CEO plays a more essential and powerful role within the organisation. El-Khatib et al. (2015) identify that CEO centrality is negatively related to acquisition performance.

Cai and Sevilir (2012) emphasise cross-firm social ties between acquirers and targets. They employ the EDGAR database and RiskMetrics Directors database and define two types of connections. First-degree connection, defined in this chapter, refers to situations where a board member serves on the boards of both the bidder and target

firms. A second-degree connection is classified when two individual board directors, respectively from acquiring and target firms, serve on the same board of a third party. Cai and Sevilir (2012) show that both connection types are associated with lower bid premiums and better M&A performance.

Ishii and Xuan (2014) adopt the BoardEx database and focus on the educational and employment background of directors as well as senior executives. Different to Cai and Sevilir (2012), Ishii and Xuan (2014) measure social connection with a ratio of number of socially connected pairs over the number of total individual pairs between acquirers and targets. They find that the existence of an acquirer-target connection leads to inferior takeover outcomes and reduces the announcement return for acquirers and newly merged firms following acquisition. The advantage of this approach is that it accounts for different board sizes. Renneboog and Zhao (2014) analyse the influence of cross-firm connection (direct and indirect) in the UK market. They find that social connection generates a striking influence on the takeover process (for example, time to resolution, probability of success and payment method). However, their paper does not show a significant relationship between social connection and acquirer announcement return.

3.2.2 Potential Impact of Social Connections

Recent studies on social network indicate that the social connection has both a positive and a negative impact in corporate performance and investment decisions. The main benefit of inter-firm connection is information advantage. The presence of social connection facilitates information transfer and exchange via individual networks and therefore reduces the information asymmetry between firms. In addition, firms with a better social network could spend less in terms of cost and

effort to obtain and process information (Myers & Majluf, 1984). A considerable number of studies confirms the existence of information advantage in social networks. For example, Uzzi (1999) suggests that firms that are socially linked with middle-market banking have a lower cost of capital than those without a social connection. Engelberg et al. (2012) find that commercial banks deliver more favourable financing terms to connected firms due to the improved information and monitoring arising from that connection, including a lower interest rate, higher credit ratings and better stock performance.

However, Ishii and Xuan (2014) show that social connection has a negative effect on takeover activities due to issues of over-trust, familiarity bias and social conformity. Social connection via an individual network builds trust beyond single business transactions and has a longer duration. Yet, over-trust leads to inefficient decision-making, resulting in inferior firm performance. Additionally, management (senior executives or directors) may over-trust the information they obtain through their personal network and overestimate the information quality as well as their power of control. Therefore, social connection may lead to the CEO hubris problem (Roll, 1986) and therefore negatively affect deal outcomes. Moreover, social connection may raise the issue of familiarity bias, which refers to the situation where individuals prefer to maintain the status quo and select familiar firms in terms of their investment decisions. Therefore, firm management with social connections may give priority to familiar partners and neglect better business opportunities beyond their individual networks, therefore resulting in less favourable investment decisions. Another issue raised in social connections is social conformity, which implies that individuals prefer to follow the decisions of the group rather than put forward their personal opinions (Cialdini & Goldstein, 2004). Similarly, social conformity may

lead to inefficient decision-making and poor firm performance.

3.2.3 Social Connections and M&A

Recently, the impact of social connection in mergers and acquisitions has attracted considerable attention from researchers. Cai and Sevilir (2012) address the board connection between acquiring firms and target firms and investigate its impact on acquisition performance. Social connection is divided into first-degree connection and second-degree connection. A first-degree connection is defined as a director having overlapping seats concurrently on the board of the acquirer and of the target before the takeover announcement. A second-degree connection refers to two individual board members, respectively from the bidder and the target, serving on the same board of a third entity before the takeover announcement. The findings show that social connection significantly increases the announcement return for acquirers and the combined entity. Moreover, bidders with a first-degree connection pay a lower acquisition premium and transaction cost, measured by total investment bank fees. Second-degree connection improves the operating performance of combined firms in the long run. The results confirm the information advantage hypothesis that social connection facilitates information exchange and reduces information asymmetry as well as agency conflicts between connected firms, therefore leading to value-created and favourable deals. Acquirers benefit from social connections with targets and have better access to target true value and have an information advantage over the potential competitors for the takeover bid. However, Cai and Sevilir (2012) do not explain why connections between bidders and targets only benefit bidding firms. One therefore asks if only acquirers benefit from board connections, why are target firms willing to accept less favourable deal items?

Ishii and Xuan (2014) provide opposite evidence and indicate that social connections have a negative impact on takeover outcomes. In their research, connections are built on the same educational or employment background of board directors and executives between acquirers and targets. Social connection is measured with a ratio of the number of socially connected pairs over the number of total individual pairs between acquirers and targets. Contrary to Cai and Sevilir (2012), the findings show that socially linked deals do not maximise shareholders' value of merging parties. Social ties, especially extensive connections, reduce the announcement return of acquiring firms and combined entities. However, social connection benefits acquirers' and targets' management. The existence of social connection significantly increases the retention probability of the target CEO, board director and connected individuals while acquirer CEOs are rewarded based on the successful takeover of connected targets. Moreover, acquisitions are more likely to occur between socially connected acquisition partners. Due to their inferior performance, these transactions with social ties are more likely to be divested. Overall, the results reveal that social ties between acquirers and targets worsen agency problems (between management and shareholders) in merger parties and weaken the disciplinary role of takeover activity, leading to inferior takeover decisions and underperformance in short run.

Renneboog and Zhao (2014) use the sample of UK acquisitions and investigate the impact of board connection, which is defined when acquirers and targets share overlapping directors. The results do not show a strong relationship between social connection and short-run acquisition performance. However, acquirers with a better board network are more likely to initiate acquisition attempts for connected targets. Social connections between merger parties are associated with a higher probability of deal completion, shorter deal duration and stock used as the payment method.

Moreover, social ties increase the retention rate of target directors who do not have seats on the acquirers' board prior to the takeover announcement. These findings support the information hypothesis in social network theory and indicate that social connection facilitates negotiations between acquisition partners and improves the efficiency of the takeover process by increasing the probability of deal consummation and reducing the time required to complete transactions.

3.3 Hypotheses

In this section, hypotheses are developed based on the main theory of social networks and M&A studies. Previous studies show that social connections have different effects on takeover outcomes. The social connection enables information transfer through personal networks and reduces information asymmetry between merging firms. Acquirers connected with targets have an information advantage and have better access (Mol, 2001) to the target's information, including non-public information. Therefore, social connection enables bidders to better acknowledge the true value of targets and therefore enhances acquirers' bargaining power in the negotiation process (Cai & Sevilir, 2012; Schoorman et al., 1981). Acquirers with connections are more likely to pay a lower acquisition premium due to information advantages (Myers & Majluf, 1984). Therefore, this chapter formulates the following hypothesis that:

H1: *Acquirers in connected deals pay lower premiums than acquirers in non-connected deals.*

According to Baker et al. (2012), both acquiring and target firms regard the target 52-week high as a reference for the premium paid or received in the negotiation. In

general, the settlement of a takeover deal should be approved by target shareholders, management and bidding firms. For the majority of target shareholders, calculating firm valuation is a complex and time-consuming task, which requires detailed information and accurate forecast of targets. Therefore, target shareholders would search for an easily available benchmark for pricing the target. Target 52-week high price is a recent peak price that the target firm has achieved before the takeover announcement and may be attained or exceeded in the future. Target 52-week high is easily obtained and widely cited in the financial media, and therefore can be used as a reference point for target valuation. For target managements, using target 52-week high price as a negotiation anchor would save time and effort in estimating firm valuation and communicating with shareholders. For acquiring firms, information shortage makes it more difficult to value and negotiate with target firms; therefore, acquirers would anchor target recent peak price in order to settle the M&A transaction.

However, social connection could alter the target valuation and negotiation for acquisition partners. The presence of inter-firm connection facilitates information transfer and exchange via individual networks and therefore reduces the information asymmetry between firms (Myers & Majluf, 1984). In M&A deals, social connection, especially first-degree connection, brings a major information advantage to the acquiring firm. Connected acquirers have better access (Mol, 2001) to the target's information, which is more detailed, accurate and current information than the target 52-week high[17] for valuing the target firm. Since information is the main driver of

[17] By definition, 52-week high is the peak price that the target reached at least 1 month before acquisition. Target valuation at takeover announcement may derive from the peak price. Therefore, target value estimated on the basis of peak price (target 52-week high) may not be accurate.

lower premiums paid to target firms, closely connected bidders are more likely to pay lower premiums. Moreover, bidder-acquirer connection greatly improves the acquirers' bargaining power (Cai & Sevilir, 2012; Schoorman et al., 1981) and weakens the effect of target reference point on premium. Therefore, we hypothesise that

H2: *After controlling for the 52-week high reference point, first-degree connected bidders pay lower premiums than non-connected bidders.*

Following Baker et al. (2012), target 52-week high reference point is computed as the log percentage difference of the target's 52-week high share price over the share price four weeks before the M&A deal announcement. Higher target reference point indicates a larger gap between target peak price and recent stock price prior to takeover announcement, therefore implying a higher likelihood of overpayment. Therefore, by anchoring high reference points (peak price of target firms), bidders are more likely to pay a higher premium and are more likely to deviate from the target's true value. Acquirers with first-degree connections have better access to target true value and better bargaining power in the negotiation, therefore pay reasonable lower offer price in deals with higher target reference point. However, a lower target 52-week high represents a smaller difference between peak price in the last 52 weeks and recent share price. Anchoring low quantile of target 52-week high for premium is associated with low premium and less likelihood of overpayment. The additional information brought by connection may have less influence in reducing the amount of premium. Therefore, we expected that

H3: *The lower premiums paid by connected bidders should be more pronounced when the target 52-week reference point is high.*

First-degree connections should have a stronger impact. Evidently, a first-degree connection is a much closer and tighter social tie for merging firms than a second-degree connection. A first-degree connection represents a more direct and efficient linkage between acquisition partners since acquirers and targets share the same directors or executives. Therefore, the closer connection magnifies the information advantage that acquirers obtain, resulting in more discounted premiums. Therefore, this chapter formulates the hypothesis that:

H4: *Acquirers in first-degree connected deals pay lower premiums than bidding firms in second-degree connected deals.*

CEO connection is more efficient in affecting acquisition premium than board connection. The information provided by target CEOs is more accurate, since they have better access to their firm's state of operation and financial situation. Therefore, acquirers with social ties with target CEOs have a greater information advantage and bargaining power during negotiations. Due to CEOs' more powerful and more essential role in decision-making (El-Khatib et al., 2015), the impact of CEO connection is expected to be more pronounced. Hence, this chapter establishes the hypothesis as follows:

H5: *Acquirers with CEO connections, especially a CEO first-degree connection, pay lower premiums than acquirers with a board connection.*

Shleifer and Vishny (2003) argue that bidders benefit when they use their overvalued equity as a method of payment. The question is, why are targets willing to accept bidders' overvalued equity? Rhodes–Kropf et al. (2005) develop a theoretical model based on market, industry and firm-specific misevaluations to explain why targets

accept bidders' overvalued equity. The close bidder-target relationship could help explain this phenomenon from a different perspective. In connected deals, a target's management is likely to accept less favourable items and promote deal completion due to their self-interest, such as retaining their seat on the board of the newly merged firm. A board seat in a combined firm certifies the director's quality and brings financial and non-financial benefits for them (Harford, 2003; H. Wang et al., 2010). Therefore, connected directors or executives may derive the interest of target firms and accept less favourable deal items. We therefore establish the following hypothesis:

H6: *Acquirers in connected deals are more likely to finance acquisitions with stock.*

3.4 Data

3.4.1 Data and selection criteria

The data is gathered from different sources. This study collects US takeover deal information over the period from 1st January 2001 to 31st December 2012 from the Thomson One database. The reason why the timeframe starts from 2001 is because there is insufficient data on US firms before 2000 in the BoardEx database. The original sample contains 83,438 deals. Due to the data available, this chapter focuses on public transactions where both acquirers and targets are quoted, leaving 3,610 observations. Moreover, this study only includes deals of at least $10 million, which narrows the sample to 2,810 deals. In addition, this study only considers takeover deals with a transfer of control, which therefore limits the sample to transactions in which the acquirer obtained more than 50% ownership of the target. A further 842 observations were excluded due to missing information in the COMPUSTAT and

CRSP databases, which gave a final full sample of 1,072 takeover transactions.

Next, this chapter adopts social connection information from BoardEx, which provides the biographical information, individual network and relationship data of board directors and executives. Recently, the BoardEx database has been widely employed in studies on social network (for example, (Engelberg et al., 2012; Ishii & Xuan, 2014; Renneboog & Zhao, 2014). The connection between acquisition partners is manually checked and collected with the Point-to-Point tool in BoardEx. The classification of social connections is based on BoardEx, including first-degree connection and second-degree connection. A first-degree connection is defined when executives or directors serve in both the acquirer's and the target's board at takeover announcement while a second-degree connection refers to a situation where two individuals, respectively from the acquirer and target firms, share the same past experience, such as educational background or employment history.

As a consequence, the full sample consists of 128 deals with a social connection and 944 deals with no connection. The connected deals include 41 first degree-connected deals, where a first-degree connection exists between merging firms, and 87 second degree-connected deals, in which only second-degree connected transactions are included. Furthermore, the socially connected deals are reclassified into 53 CEO-connected deals, in which either the acquirer CEO or the target CEO links the bidding and target firms, and 111 board-connected deals, in which an acquirer board member is the connection between the merging firms. Specifically, there are 24 first-degree CEO-connected deals where the CEO in the bidding or target firm serves as an executive, and 29 second-degree CEO-connected deals, in which the acquirer or target CEOs share the same past experience with board members or executives in

the other merging firm. Likewise, deals with a board connection include 30 first-degree board-connected deals, in which acquirer board members also serve on the target's board, and 81 second-degree board-connected deals, in which the acquirer board members have social ties with target board members through past experience.

3.4.2 Sample

[Insert Table 3.1About Here]

The sample consists of 1,072 US takeover deals announced between 2001 and 2012. Table 3.1 presents the distribution of takeover deals by year (Panel A) and by industry of the acquiring firms (Panel B) for the full sample, connected deals and non-connected deals. In Panel A, the number of takeover deals gradually decreases from 2001 to 2012. The highest proportion of connected deals in the full sample fall within 2007 to 2009 during the financial crisis (17.20% for 2007; 16.44% for 2008; 20.63% for 2009). Panel B shows the number and percentage of takeover deals classified by industry of acquiring firms. Industries are classified using the 12 Fama-French classifications. In general, the majority of takeover deals occur in the finance, business equipment and healthcare industries. In the chemicals and utilities industries, the percentage of connected deals is 35.71% and 39.13%, respectively, which is the highest among all of the industries.

[Insert Table 3.2 About Here]

Table 3.2 reports the descriptive statistics for the firm and deal characteristics of the full sample, the connected deals and the non-connected transactions. The variable definitions and data sources are listed in Appendix A. In the deals where acquirers

and targets are socially connected, bidding firms have a higher return on assets (ROA) than acquirers in non-connected deals, implying that acquirers in connected deals have higher pre-takeover profitability. In addition, the acquirers and targets are significantly larger in size in connected deals, leading to a larger transaction value. More importantly, connected deals are associated with significantly lower premiums and stock being used as the medium of payment, which preliminarily supports the information hypothesis.

3.5 Empirical Results

3.5.1 Impact of Social Connections and Target 52-week Reference Point on Acquisition Premiums

The presence of cross-firm connections has a two-fold impact on acquisition premiums. On the one hand, the information hypothesis illustrates that bidders could benefit from social connections by paying lower premiums due to their better understanding of their targets' true value and improved bargaining power during negotiations. On the other hand, social connection between merging firms could lead to overpayment on account of acquirer CEOs' overconfidence, overtrust, familiarity bias and social conformity. Due to the ambiguous influence on the premium, this chapter re-examines the relationship between social connections and acquisition premiums. More importantly, this study introduces the reference point theory (Baker et al., 2012), which states that both acquiring and target firms determine and adjust acquisition premiums by being anchored by the target's past price as a reference point. Therefore, this study adopts the reference point – target 52-week high – in the premium analysis to explore whether the premium is more sensitive to cross-firm connections than to the reference point.

3.5.1.1 Univariate analysis

In Table 3.3, the offer premium for connected deals is on average 37.02%, -5.54% less than the premium paid in non-connected deals. Bidding firms with first-degree connections pay the lowest premiums (25.59%) at 16.98% less than the premium in non-connected deals. In second-degree connected transactions, bidding firms still pay 0.15% less than firms in non-connected deals. The findings preliminarily illustrate that the existence of a social connection reduces the bid premium paid to the target.

[Insert Table 3.3 About Here]

Remarkably, the target 52-week high in first-degree connected deals is 84.98% – the second highest value in the entire sample and 29.80% larger than in deals with a second-degree connection. According to Baker et al. (2012), target 52-week high is significantly and positively associated with bid premiums; therefore, acquirers with a first-degree connection should have paid higher premiums to their targets. However, acquirers in first-degree connected deals pay the lowest premium at 25.59%, which is 16.83% less than in second-degree connected deals. The findings so far suggest that first-degree connection seems to have a large impact on premium and is not affected by the target 52-week high.

[Insert Table 3.4 About Here]

In Table 3.4, the full sample is split into three quantiles (low, medium, high) on the basis of target 52-week high. The takeover deals in the high quantile are related with a higher level of target 52-week high and are expected to involve a higher offer premium, therefore implying a higher possibility of overpayment (Baker et al., 2012).

By contrast, acquirers in the low quantile of target 52-week high are expected to pay a lower premium and therefore be less likely to overpay for deals. In each quantile, the acquisition sample is further divided into the non-connected and connected deal subsamples (including first-degree and second-degree connected deals).

Except for the first-degree connected deals, the acquisition premium increases progressively from the low quantile to the high quantile, which indicates an incremental potential of overpayment (Baker et al., 2012). For each quantile, connected deals have lower average premiums than non-connected deals, and the difference is -8.98% in the low quantile and -6.22% in the high. Moreover, the premium paid in the highly connected deals (first-degree connection) is 36.64% less than the premium in non-connected deals, in the highest quantile of the target 52-week high. Overall, connected acquirers pay less, and acquiring firms with a close connection (first-degree connection) spend less than bidders with weak connections (second-degree connection). These findings are consistent with the hypothesis, indicating that social connection, especially first-degree connection, reduces the acquisition premium due to acquirers' information advantage in socially connected deals, and does not seem to be affected by the target's 52-week high reference point. The premium paid in first-degree connected deals is reduced as the target 52-week high increases, suggesting that the reference point is not the main determinant of the premium in first-degree connected deals.

3.5.1.2 Multivariate analysis

This chapter further proceeds with multivariate premium analysis to test the robustness of the previous finding. In Table 3.5, acquisition premium is regressed against connection dummy variables (including variables for any connection,

first-degree connection and second-degree connection) which equal one if the acquirers and targets are socially connected, and zero otherwise. Moreover, the target 52-week high is introduced to signify the psychological anchor and detect potential overpayment in transactions. Following Baker et al. (2012), target 52-week high is computed as the log percentage difference of the targets' 52-week high and their target price 30 days before the announcement. The study also controls common variables in previous M&A studies, such as Tobin's Q (Officer, 2003; Schwert, 2000), leverage (Schwert, 2000), return on assets, and size of acquirer (Moeller et al., 2004) in terms of firm characteristics. Variables for deal characteristics consist of relative size of deal (Moeller et al., 2004), payment method, deal attitude (Schwert, 2000), and whether the bid involves multiple bidders (Walkling & Edmister, 1985). Additionally, both year and industry fixed effects are included in the regressions.

[Insert Table 3.5 About Here]

In Models 1 and 2, connection, and in Models 5 and 6, first-degree connection is significantly and negatively associated with acquisition premiums. Consistent with the hypothesis, the result shows that social connection, particularly first-degree connection, facilitates information exchange, reduces the information asymmetry between merging firms and enhances the bargaining power of acquirers, therefore leading to lower premiums. In addition, the strong negative relation between premiums and connections, especially for first-degree connections, remains robust in Models 3, 4, 7 and 8, even after controlling for the target 52-week high. Model 4 shows that acquirers with a social connection pay 15.06% lower premiums than those with no connection (the coefficient is -0.1506, significant at 10%). In particular, the coefficient for the first-degree connection is -0.6006 in Model 8, significantly

different from zero at the 1% level. These findings demonstrate that the negative impact of first-degree connection is not weakened by the anchoring effect (target 52-week high reference point) in terms of acquisition premium. Social connection, especially first-degree connection, greatly improves the information advantage for acquirers and transfers both public and private information via individual networks. Acquirers that are socially linked with targets obtain more information and rely less on target 52-week high to value target firms and negotiate acquisition premium.

However, the relationship between second-degree connection and premium is insignificant in all models. These findings are in accordance with Cai and Sevilir (2012), who suggest that targets in higher-connection deals obtain lower premiums. The results can be explained by the greater information advantage associated with first-degree connections. Having a close connection with a target means that acquirers benefit from more accurate target information and enhance their bargaining power in the negotiation process.

Consistent with Baker et al. (2012), 52-week high is shown to carry significant and positive coefficients in all the regression models. The findings confirm that higher target 52-week highs result in higher acquisition premiums paid to targets. Moreover, the increase in relative deal size decreases acquisition premium, in line with Alexandridis et al. (2013). The negative relation could be attributed to lower competition for large takeover transactions (Gorton, Kahl, & Rosen, 2009), leading to a less pronounced "winner's curse" (Alexandridis, Petmezas, & Travlos, 2010) and less overpayment to targets (Alexandridis et al., 2013).

To further disentangle the effect between connections and the target 52-week reference point, the full sample is divided into three quantiles (low, medium, high)

according to the target 52-week reference points. The study then re-examines the relationship between acquisition premium and social connection in the subsample of low/high target 52-week high in Table 3.6. In Models 1 and 2, the dependent variable is the connection variable. In Models 3 and 4, the acquisition premium is regressed against first-degree and second-degree connection.

[Insert Table 3.6 About Here]

In Table 3.6, the relationship between premium and connection, especially first-degree connection, is more negative and significant in the subsample of high target 52-week highs than in the group with low target 52-week highs. In Model 4, the coefficient for first-degree connection is -0.7753 in the high quantile and significant at the 1% level, while the coefficient in the low quantile is -0.4770 and statistically insignificant. As expected in the third hypothesis, first-degree connection has more pronounced effects in the deals with higher target 52-week high reference points. Higher target 52-week high[18] represents a larger gap between the peak price and recent price of target firms. Compared with low target 52-week high, high 52-week high is more likely to deviate from target true value, resulting in higher premium being paid. However, acquirers with social connection, particularly first-degree connection, could estimate firm value more accurately and negotiate a reasonable price due to the information advantage. Therefore, the negative impact of connection, particularly first-degree connection, is more pronounced and stronger in deals with a high reference point. In the low quantile of reference points, target 52-week high deviates less from target true valuation. Acquirers are less likely to

[18] Following Baker et al. (2012), target 52-week high is computed as the log percentage difference between 52-week high price, the recent peak price that target firms achieved, and target price at 4 weeks before the takeover announcement.

overpay by anchoring a low target 52-week high. Therefore, information advantage brought by the first-degree connection has the limited effect of further reducing the acquisition premium. Therefore, social connection, particularly first-degree connection, has more pronounced effects in premium when the target 52-week high reference point is higher. Hence, information is the main driver for the acquisition premium relative to anchoring, as captured by the reference point of the target 52-week high.

3.5.1.3 Why do director connections favour acquirers, and why do targets accept lower premiums?

The findings presented so far indicate that acquiring firms take over connected targets at a lower premium, especially when the acquirer and target boards share the same directors. According to the agency theory, directors are recruited to represent shareholders' interests and act as a monitoring device. While directors are in general influenced by the target 52-week high, in socially connected deals, managers are less influenced by the reference point and accept a significantly lower acquisition premium. In this section, this research explores the incentive of why directors are more likely to favour the acquirer and why target boards are willing to be acquired with a low offer premium.

[Insert Table 3.7 About Here]

In first-degree connected deals, Table 3.7 shows that all interlocking directors who served in both the acquirer and the target firm continue to stay in the new board of combined firms after the acquisition, since interlocking directors have better acknowledgement and understanding in both acquirers and targets and therefore could facilitate and accelerate the post-merger integration process (Y. Li & Aguilera,

2008). In first-degree connected deals, the chapter classifies interlocking directors' board positions both in the acquirer and target firm into the following categories: CEO, Chairman, independent director or common director. According to the importance and influence in corporate decisions of these positions, two levels of importance are defined. The first level includes the CEO and Chairman roles while the second refers to the common director and independent director. Higher-level positions for acquirers (targets) indicate that the interlocking director holds a more important position in the acquirer (target) than in the target (acquirer) respectively while the same level position indicates that directors serve at the same level in both acquisition partners. The empirical results show that 29.27% of connected directors hold higher positions and have more power in the acquiring firms than in the targets, and 60.98% of interlocking directors have the same board position level in the acquirer and target. Only around 10% of the interlocking directors were found to hold more important positions in the target firm than in the acquirer. Panel A of Table 3.7 shows that on average the acquisition premium is 11.49% when the director holds a higher and more powerful position in the acquirer while the acquisition premium is 88.76% when directors hold a higher-level board seat in the target, indicating that directors favour the firms in which they dominate. The acquisition premium is on average 17.62% in takeover deals in which a director acts at the same level of board position in both acquisition partners, indicating that directors are prone to protecting acquirers' interests. The multivariate analysis results in Panel C of Table 3.7 further enhance this conclusion.

In second-degree connected deals, target directors share the same experience (education, employment, others) with acquirer directors. In general, few target directors can continue to serve in the new board after takeovers are completed

(Harford, 2003). However, in second-degree connected deals, 42.53% (37/87) of target connected directors are retained in the board of the combined firm following takeover deals, implying that social connections with the acquirer's board play an essential role in determining whether target directors stay or leave. Moreover, acquirers which retain target connected directors pay a lower acquisition premium (39.72%), implying that target directors may put their personal interests above those of their firms' shareholders. These results are presented in Panel B of Table 3.7. Harford (2003) documents that target boards would resist a takeover bid or charge a high acquisition premium to compensate them for any financial, information or network loss due to the loss of a directorship. Similarly, H. Wang et al. (2010) provide evidence that target directors sacrifice shareholders' interest and accept a lower acquisition premium in exchange for a directorship in the combined firms. Moving to the board of the combined firm would signal the high quality and expertise of that director, resulting in more job opportunities in the labour market. For retained directors, accepting a low acquisition premium can be regarded as protecting future shareholders' interest. The multivariate analysis results in Panel C further support our finding that retaining connected directors is associated with a low acquisition premium and confirm that connected board directors in target firms have a strong self-incentive to complete acquisitions even at the cost of shareholder interest.

3.5.2 Endogeneity test

In this section, the two-stage-least-square (2SLS) procedure is adopted to address possible endogeneity problems concerning bid premium. In order to avoid correlation between independent variables and the residuals in OLS regressions, the

instrumental variables (IVs) are associated with the explanatory variables and not affected by error components in the models. Specifically, this instrument determines whether a social connection existed between acquirers and targets three years before the announcement as merging parties generally do not prepare takeover bids three years in advance. However, a social connection built previously may have been ongoing for years. Therefore, connection formed previously may be related to a social network during takeover announcement, but have no direct effect on takeover transactions.

[Insert Table 3.8 About Here]

Herein, this study employs connections three years before the announcement as the instrumental variable for connection in previous OLS regressions, first-degree connections built three years before the announcement and second-degree connections built three years before the announcement. Table 3.8 presents both the first and second stages for the endogeneity test. Year and industry fixed effects are controlled in all models. Target 52-week high is included in Models 2 and 4. The endogeneity results lead to similar conclusions as the previous sections. Table 3.8 shows a negative impact of social connection, especially first-degree connection, on acquisition premium. The coefficient for first-degree connection is negative and statistically significant at 1%, even with the target 52-week high controlled in Model 4. Moreover, the research proceeds with the Hausman test to further check the endogeneity when the independent variable is connection (any connection), first-degree connection and second-degree connection. The null hypothesis for the Hausman test is that the connection variable is exogenous. The *p*-value of the Hausman test is 0.5299 when connection (any connection) is the regressor, while the

p-value is 0.1681 when first-degree connection and second-degree connection are the independent variables. Therefore, the study cannot reject the null hypothesis that connection variables are exogenous.

3.5.3 Alternative Proxy for Social Connection

El-Khatib et al. (2015) look at CEO centrality to study the relationship between acquisitions and within-firm social connections; they show that takeover activities are strongly influenced by CEO centrality. CEOs with higher centrality negatively affect acquisition performance. CEO centrality qualifies the strength and importance of a CEO within top management in terms of their performance, decision-making power and dedication. Higher CEO centrality implies that a CEO plays a more essential and powerful role within their organisation. Therefore, this chapter employs an alternative proxy related to CEO for connectedness between acquirers and targets as a robustness analysis for takeover premium. The cross-firm connection is reclassified into only CEO connections. Specifically, CEO connections refer to instances when the acquirer or target CEO acts as a go-between for the bidding firms and targets. CEO connections are further split into CEO first-degree connections, in which the acquirer (target) CEO also works as a target (acquirer) board or management member, and CEO second-degree connections where the acquirer or target CEO shares the same past experience with board members or executives in the counterparty.

Table 3.9 reports the relationship between acquisition premium and CEO connection, including first-degree and second-degree connection. The reference point – target 52-week high is included in Models 2 and 4. In Models 5 and 6, the full sample is split into three quantiles (low, medium, high) to analyse the impact of CEO

connection on acquisition premium in the subsample of low/high target 52-week highs. Both year and industry fixed effects are controlled in all models. This study also tests all models without year and industry effects and finds the same results; the results remain robust.

[Insert Table 3.9 About Here]

In Table 3.9, the coefficient for CEO connection is -0.3543, significant at 5%, while the coefficient for CEO first-degree connection is -0.7545, significant at 1% with target 52-week high controlled. The findings suggest that acquisition premium is markedly reduced by CEO connection, especially first-degree connection. In Models 5 and 6, the coefficients for the CEO connection variable are more negative and significant when the takeover deals are in the high quantile of target 52-week high. The coefficient for CEO first-degree connection is -0.5519 (insignificant) in the subsample of low target 52-week highs, while the coefficient is -1.0470 (significant at 1%) in the subsample of high target 52-week highs. The results reveal that CEO connection, especially first degree, is more pronounced in the high reference point subsample. This indicates that CEOs with connections, especially first-degree connections, are not anchored by the target's reference point and indeed pay lower premiums.

3.5.4 Acquisition Timing and the Method of Payment

Previous findings indicate that acquirers could benefit from social connections and the consequent higher information advantage they provide by paying lower premiums to targets. In this section, the chapter further explores whether bidders could exploit this information advantage and the close relationships they have with

target firms in other aspects. This study investigates whether connected bidders attempt to time their acquisition, and whether this would have an effect on the method of payment.

3.5.4.1 Acquisition Timing

The study first analyses the takeover timing from the perspective of pre-announcement stock movements of bidders. Acquirer stock run-up is defined as the bidders' buy-and-hold returns over the period starting 200 trading days and ending 2 months prior to the deal announcement (Cai & Sevilir, 2012).

[Insert Table 3.10 About Here]

Table 3.10 tabulates the average acquirer stock run-up in non-connected deals and connected deals, including first-degree and second-degree connections. The acquirer pre-announcement run-up is positive and salient in all samples. The acquirers in connected deals have, on average, 16.43% run-up, while the acquirer run-up is 8.88% in non-connected deals. Moreover, the difference in price run-up is 7.55% and significantly different from zero. In first-degree connected deals, the acquirer run-up reaches 28.44% – far greater than the run-up in the rest of the samples. The difference in run-up in non-connected deals is 19.56%, significant at the 1% level. However, the acquirers' run-up in second-degree connected deals is slightly larger than the run-up in non-connected takeovers. The findings show that acquirers with social connections are more likely to take over targets when their pre-announcement stock value is higher, and particularly bidders with a first-degree connection. High acquirer run-up is an indicator of overvaluation. This indicates that connected acquirers are likely to time their acquisitions and proceed when their stock is

overvalued. The natural question that arises, and is explored in the following section, is whether connected acquirers are more likely to finance their deals using their stock.

3.5.4.2 Method of Payment

The previous section demonstrates that acquirer pre-announcement run-up is higher when acquiring firms are socially connected with their targets. According to previous research, acquirers are more likely to finance takeovers with stock when their stock is overvalued. In this section, this chapter employs logit regression and examines the payment method in deals with a social connection. The dependent variable is a stock dummy, which is equal to one if deals are fully paid using stock. The explanatory variables include connection (any type), first-degree connection and second-degree connection. The models also include the other control variables: year fixed effect and industry fixed effect.

In Table 3.11, all of the models show a marked relationship between the medium of payment and the variables representing connection. The first three models explore the influence of connection on payment method. The coefficients for connection are all positive and salient, implying that bidders in connected deals are prone to financing their bids with their own stock. The second and third groups illustrate that stock deals are positively related to first- and second-degree connections, significant at the 1% level. Moreover, the coefficients for first-degree connection are greater than those for second-degree connections, indicating that a closer connection has a bigger impact on the choice of payment medium. Therefore, acquirers with a first-degree connection tend to choose stock to pay for takeover activities.

[Insert Table 3.11 About Here]

As a consequence, acquirers with a social connection are prone to take over targets using stock when their stock is overvalued. Fu et al. (2013) indicate that targets have an incentive to request higher premiums when acquirers pay for takeover deals with overvalued shares. However, targets with a cross-firm connection are likely to accept a low premium from the acquirers, indicating that the social connection enhances acquirers' bargaining power and smooths the communication and negotiation processes. Besides a low premium paid, acquirers also benefit from social connection by selecting favourable acquisition timing and payment methods.

Likewise, the target 52-week high generates a positive influence on payment method. A higher target 52-week high implies a higher bid premium, and stock payment could save acquirers more when their equity is overvalued. Therefore, target 52-week high is positively associated with acquisition premium. Consistent with Renneboog and Zhao (2014), the findings show that smaller-sized bidders tend to finance takeover bids with stocks.

3.6 Conclusion

With a US sample from 2001 to 2012, this chapter examines the influence of cross-firm social connections on acquisition premium during takeover activities. The empirical findings support the view that bidding firms with social connections with targets pay lower acquisition premiums. The savings in premiums would be larger when the two merging firms share the same board member or executives (that is, a first-degree social connection). To disentangle whether social connections are more related to better information flow or a familiarity bias, this study introduces the

reference point theory (Baker et al., 2012) as an additional testing framework. Acquirers in first-degree connected deals would rely more on information advantages to value a target rather than psychological reference point — the target 52-week high. The impact of first-degree connection is more pronounced when target 52-week high reference point is higher. Moreover, connected directors who are invited to participate in the new board of the new combined firm have stronger personal incentives to compromise on a low acquisition premium at the cost of the target shareholders' interest. After reclassifying social connection into CEO connection, the findings show that bid premiums are largely reduced when either the target or acquirer CEO links the two merging firms. The results indicate that CEO connection is more efficient and valuable than board connection in affecting takeover activities.

Furthermore, a favourable acquisition timing and payment method for acquirers could partially explain the negative relationship between social connection and acquisition premium. Consequently, acquirers in connected deals tend to take over targets when their own shares are highly valued and the target's recent share price is far lower than its highest price over the previous year. Therefore, acquirers are prone to finance acquisitions with equity when their stock is overvalued.

Table 3.1 – Descriptive Statistics

Table 3.1 presents the distribution of takeover deals across the year (Panel A) and industry of acquiring firms (Panel B) for the full sample, connected deals and non-connected deals. The percentage of connected deals (non-connected deals) is computed as the number of connected deals (non-connected deals) divided by the number of full takeover deals. Connected deals refers to takeover transactions in which the acquiring firm and target firm are socially tied with either first-degree or second-degree connections. A first-degree connection refers to a situation in which a board director or executive serves on both the acquiring and target firm boards during the deal announcement, while a second-degree connection is defined when two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background). Non-connected deals are takeover transactions with no acquirer-target connection found in the BoardEx database. The industry classifications are according to the Fama-French 12 industry classifications.

Panel A: Distribution of takeover deals across year

Year	Full sample	Connected deals		Non-connected deals	
	Number	Number	Percentage	Number	Percentage
2001	144	14	9.72%	130	90.28%
2002	88	11	12.50%	77	87.50%
2003	124	13	10.48%	111	89.52%
2004	120	8	6.67%	112	93.33%
2005	102	12	11.76%	90	88.24%
2006	107	9	8.41%	98	91.59%
2007	93	16	17.20%	77	82.80%
2008	73	12	16.44%	61	83.56%
2009	63	13	20.63%	50	79.37%
2010	73	9	12.33%	64	87.67%
2011	47	8	17.02%	39	82.98%
2012	38	3	7.89%	35	92.11%
Total	1072	128	11.94%	944	88.06%

Panel B: Distribution of takeover deals across industry

Industry	Full sample	Connected deals		Non-connected deals	
	Number	Number	Percentage	Number	Percentage
Consumer Nondurables	25	1	4.00%	24	96.00%
Consumer Durables	8	2	25.00%	6	75.00%
Manufacturing	50	7	14.00%	43	86.00%
Energy, Oil, Gas and Coal	47	12	25.53%	35	74.47%
Chemicals	14	5	35.71%	9	64.29%
Business Equipment	281	38	13.52%	243	86.48%
Telephone and Television	23	2	8.70%	21	91.30%
Utilities	23	9	39.13%	14	60.87%
Wholesale and Retail	45	6	13.33%	39	86.67%
Healthcare and Med. Equip	123	18	14.63%	105	85.37%
Finance	349	22	6.30%	327	93.70%
Other	84	6	7.14%	78	92.86%
Total	1072	128	11.94%	944	88.06%

Table 3.2 – Summary statistics

Table 3.2 reports the descriptive statistics for the firm and deal characteristics of the full sample of connected deals and non-connected transactions. Connected deals refers to takeover transactions in which the acquiring firm and target firm are socially tied with either first-degree or second-degree connections. A first-degree connection refers to a situation in which a board director or executive serves on both the acquiring and target firm boards during the deal announcement, while a second-degree connection is defined when two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background). Non-connected deals are takeover transactions with no acquirer-target connection found in the BoardEx database. Definitions of variables are listed in Appendix A. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Variables	**Full sample (1)**		**Connected deals (2)**		**Non-connected deals (3)**		**Connected – Difference (2) - (3)**
	Mean	**Standard deviation**	**Mean**	**Standard deviation**	**Mean**	**Standard deviation**	
Panel A: Acquirer related							
Tobin's Q	3.19	12.20	4.22	14.51	3.05	11.86	1.17
Market Value	8.01	2.14	8.37	2.17	7.96	2.13	0.40**
Leverage	37.25%	0.28	34.12%	0.2624	37.68%	0.2864	-3.56%
Return on Assets (ROA)	2.46%	15.15%	3.69%	0.1270	2.29%	0.1546	1.40%**
Panel B: Target related							
Tobin's Q	2.62	9.92	2.75	7.33	2.60	10.21	0.15*
Market Value	5.51	1.82	6.36	1.9	5.39	1.76	0.97***
Leverage	37.92%	1.26	34.87%	0.3402	38.32%	1.329	-3.45%
Return on Assets (ROA)	-5.57%	0.28	-3.03%	0.2307	-5.90%	0.28	2.87%
Panel C: Deal-related							
Transaction value (USD millions)	1,958.88	6,244.67	4,126.12	10,088.48	1,665.02	5,464.25	2461.10***
Premium (%)	41.09%	0.75	37.02%	1.07	42.56%	0.70	-0.056***
Hostile Takeover	1.31%	0.11	1.56%	0.02	1.27%	0.11	0.00
Competing Bid	4.19%	0.20	3.13%	0.17	4.34%	0.20	-0.01
Pure Cash Deal	38.81%	0.49	33.59%	0.47	39.51%	0.40	-0.06
Pure Stock Deal	24.62%	0.43	39.06%	0.49	22.67%	0.42	0.16***
52-week High (%)	33.72%	0.39	35.42%	0.37	33.49%	0.40	0.02
Relative Deal Size	0.32	0.44	0.38	0.42	0.31	0.45	0.064*
Number of Observations	1072		128		944		

Table 3.3 – Acquisition Premium Analysis

Table 3.3 reports the univariate analysis for target 52-week high and acquisition premium for the full sample of connected deals (first-degree and second-degree connected deals) and non-connected deals. The difference of target 52-week high and premium is shown between connected deals (first-degree and second-degree connected deals) and non-connected deals. Connected deals refers to takeover transactions in which the acquiring firm and target firm are socially tied with either first-degree or second-degree connections. A first-degree connection refers to a situation in which a board director or executive serves on both the acquiring and target firm boards during the deal announcement, while a second-degree connection is defined when two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background). Non-connected deals are takeover transactions with no acquirer-target connection found in the BoardEx database. Target 52-week high is defined as the target's highest stock price over the period from 365 days before to 30 days before the takeover announcement, denoted as the log percentage difference of target stock price 30 days before the takeover announcement (Baker et al., 2012). ***, ** and * represent significance at 1%, 5% and 10%, respectively.

	Full Sample (1)	**Connected deals (2)**	**First-degree connected (3)**	**Second-degree connected (4)**	**Non-connected deals (5)**	**(2) - (5)**	**(3) - (5)**	**(4) - (5)**	**(3) - (4)**
Premium	0.4190***	0.3702***	0.2559***	0.4241***	0.4256***	-0.0554***	-0.1698***	-0.0015 **	-0.1683*
Target 52-week High	0.8465***	0.6470***	0.8498***	0.5517***	0.8737***	-0.2267*	-0.0240**	-0.3220**	0.2980**
Observations	1072	128	41	87	944				

Table 3.4 – Acquisition Premium Analysis and Reference Point

Table 3.4 compares the impact of social connections and reference point hypothesis on acquisition premiums and shows the acquisition premium for the full sample, connected deals (first-degree and second-degree connected deals) and non-connected deals. Furthermore, the full sample is split into three quantiles (low, medium, high) on the basis of target 52-week high. The difference of premium is shown between connected deals (first-degree and second-degree connected deals) and non-connected deals. Connected deals refers to the takeover transactions in which acquiring firm and target firm are socially tied with either first-degree or second-degree connections. A first-degree connection refers to a situation in which a board director or executive serves on both the acquiring and target firm boards during the deal announcement, while a second-degree connection is defined when two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background). Non-connected deals are takeover transactions with no acquirer-target connection found in the BoardEx database. Target 52-week high is defined as the target's highest stock price over the period from 365 days before to 30 days before the takeover announcement, denoted as the log percentage difference of target stock price 30 days before the takeover announcement (Baker et al., 2012). ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Premium	**Full Sample (1)**	**Connected deals (2)**	**First-degree connected (3)**	**Second-degree connected (4)**	**Non-connected deals (5)**	**(2) - (5)**	**(3) - (5)**	**(4) - (5)**
52-Week high								
Low	0.2519	0.1729	0.11	0.1767	0.2627	-0.0898**	-0.1527**	-0.0860**
Medium	0.3794	0.3158	0.3508	0.2992	0.3861	-0.0702*	-0.0353	-0.0869**
High	0.6262	0.5729	0.2687	0.6442	0.6351	-0.0622**	-0.3664***	0.0091*
Observations	1072	128	41	87	944			

Table 3.5 – Determinants of the acquisition premium

Table 3.5 reports the results of OLS regressions for acquisition premium. In all models, the acquisition premium is regressed against dummy variables for social connection. The acquisition premium is defined as the offer price, as the log percentage difference from the target's share price four weeks before the M&A deal announcement (Baker et al., 2012). The independent variable in Models 1, 2, 3 and 4 is connection, which is equal to one if acquirers are socially connected with targets. The dependent variables in Models 5, 6, 7 and 8 are first-degree and second-degree connections. A first-degree connection refers to a situation in which a board director or executive serves on both the acquiring and target firm boards during the deal announcement, while a second-degree connection is defined when two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background). Moreover, the target 52-week high reference point is included in Models 3, 4, 7 and 8. Target 52-week high is defined as the target's highest stock price over the period from 365 days before to 30 days before the takeover announcement, denoted as the log percentage difference of target stock price 30 days before the takeover announcement (Baker et al., 2012). Models 1, 3, 5 and 7 are specified without industry and year fixed effects. In Models 2, 4, 6 and 8, industry and year fixed effects are controlled. For brevity, results for the industry and year dummies are not reported. Definitions of variables are listed in Appendix A. t-statistics are listed. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Acquisition Premium	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Connection	-0.2073**	-0.1619*	-0.2025**	-0.1506*				
	(-2.24)	(-1.74)	(-2.27)	(-1.66)				
First-degree Connection					-0.6354***	-0.5796***	-0.6651***	-0.6006***
					(-2.88)	(-2.66)	(-3.06)	(-2.75)
Second-degree Connection					-0.0252	0.0138	-0.0058	0.0389
					(-0.26)	(0.13)	(-0.06)	(0.40)
Target 52-week High			0.7088***	0.6217***			0.7179***	0.6324***
			(8.65)	(7.12)			(7.53)	(6.38)
Acquirer Tobin's Q	0.0016	0.0011	0.0008	0.0008	0.0014	0.0010	0.0005	0.0006
	(0.72)	(0.49)	(0.35)	(0.37)	(0.75)	(0.59)	(0.48)	(0.46)
Acquirer Market Value	-0.0354**	-0.0343**	-0.0258*	-0.0244	-0.0398**	-0.0394**	-0.0304*	-0.0297
	(-2.20)	(-2.06)	(-1.66)	(-1.49)	(-2.32)	(-2.22)	(-1.85)	(-1.70)

Acquirer Leverage	-0.2634**	-0.0128	-0.0716	0.0579	’-0.2606**	-0.0164	-0.0661	0.0552
	(-2.36)	(-0.10)	(-0.65)	(0.45)	（-2.22）	(-0.13）	(-0.61)	(0.46)
Acquirer Return on Assets	-0.3915*	-0.4164*	-0.1350	-0.1983	-0.3576	-0.3843	-0.0951	-0.1599
	(-1.69)	(-1.81)	(-0.60)	(-0.87)	（-1.10）	（-1.23）	(-0.32)	(-0.54)
Target Tobin's Q	-0.0046	-0.0045	-0.0040	-0.0038	-0.0043	-0.0042	-0.0036	-0.0035
	(-1.63)	(-1.62)	(-1.47)	(-1.42)	（-1.13）	（-1.32）	(-0.84)	(-1.01)
Target Leverage	-0.0540	0.0100	-0.0341	0.0089	-0.0543	0.0095	-0.0342	0.0084
	(-0.78)	(0.14)	(-0.51)	(0.13)	（-0.76）	(0.15）	(-0.59)	(0.14)
Target Return on Assets	-0.4826***	-0.3769***	-0.1379	-0.1132	-0.4870*	-0.3794	-0.1383	-0.1114
	(-4.27)	(-3.26)	(-1.19)	(-0.96)	（-1.80）	(-1.49)	(-0.58)	(-0.49)
Relative Deal Size	-0.2799***	-0.2671***	-0.2591***	-0.2456***	-0.2950***	-0.2846***	-0.2752***	-0.2641***
	(-3.85)	(-3.59)	(-3.70)	(-3.39)	(-3.62)	(-3.29)	(-3.69)	(-3.29)
Pure Stock Deal	-0.0439	-0.0308	-0.1169*	-0.0932	-0.0378	-0.0271	-0.1112	-0.0903
	(-0.62)	(-0.43)	(-1.70)	(-1.33)	(-0.52)	(-0.36)	(-1.56)	(-1.21)
Hostile Takeover	-0.1765	-0.2599	-0.2258	-0.2770	-0.1563	-0.2394	-0.2046	-0.2553
	(-0.68)	(-1.01)	(-0.90)	(-1.11)	(-0.62)	(-0.88)	(-0.76)	(-0.93)
Competing Bid	-0.0946	-0.1085	-0.1253	-0.1175	-0.0904	-0.1082	-0.1213	-0.1174
	(-0.63)	(-0.73)	(-0.87)	(-0.82)	(-0.50)	(-0.57)	(-0.68)	(-0.63)
Diversification	0.0112	-0.0036	-0.0028	-0.0101	0.0135	0.0004	-0.0005	-0.0059
	(0.18)	(-0.06)	(-0.05)	(-0.16)	(0.21)	(0.01)	(-0.01)	(-0.09)
Constant	-0.6721***	-0.3845*	-1.0312***	-0.7376***	-0.6373***	-0.3460	-0.9982***	-0.7021***
	(-4.61)	(-1.68)	(-7.05)	(-3.23)	(-4.08)	(-1.23)	(-6.33)	(-2.50)
Year-fixed-effects	No	Yes	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1072	1072	1072	1072	1072	1072	1072	1072
Adjusted R2	0.065	0.110	0.133	0.156	0.074	0.119	0.144	0.166

Table 3.6 – Acquisition premium analysis in subsamples of low/high target 52-week high

Table 3.6 reports the multivariate analysis for the acquisition premium in the subsamples of low/high target 52-week high. Target 52-week high is defined as the target's highest stock price over the period from 365 days before to 30 days before the takeover announcement, denoted as the log percentage difference of target stock price 30 days before the takeover announcement (Baker et al., 2012). The full sample is split into three groups based on the target 52-week high. The low group in each model refers to the subsample in which the deals have the lowest target 52-week high (in Model 1 and Model 3), while the high group is the subsample in which the deals have the highest target 52-week high (in Model 2 and Model 4). In all models, acquisition premium is regressed against a dummy variable indicating if the acquirer and target firm are socially connected. The acquisition premium is defined as the offer price, as the log percentage difference from target's share price four weeks before the M&A deal announcement (Baker et al., 2012). The independent variable in Models 1 and 2 is connection, which is equal to one if acquirers are socially connected with targets. The dependent variables in Models 3 and 4 are first-degree and second-degree connection. A first-degree connection refers to a situation in which a board director or executive serves on both the acquiring and target firm boards during the deal announcement, while a second-degree connection is defined when two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background). In all models, industry and year fixed effects are controlled. For brevity, results for the industry and year dummies are not reported. Definitions of variables are listed in Appendix A. t-statistics are listed. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Acquisition Premium	Model 1	Model 2	Model 3	Model 4
	Low	High	Low	High
Connection	-0.0815	-0.2679*		
	(-0.50)	(-1.67)		
First-degree Connection			-0.4770	-0.7753***
			(-1.16)	(-2.96)
Second-degree Connection			0.0262	0.0306
			(0.14)	(0.16)
Acquirer Tobin's Q	0.0149*	0.0047	0.0142	0.0003
	(1.65)	(0.86)	(0.86)	(0.06)
Acquirer Market Value	0.0402	-0.0252	0.0345	-0.0500
	(1.38)	(-0.82)	(1.10)	(-1.63)
Acquirer Leverage	0.0135	-0.0294	0.0358	0.1768
	(0.06)	(-0.14)	(0.17)	(0.74)
Acquirer Return on Assets	-0.6879	-0.3453	-0.6992*	-0.2464
	(-1.23)	(-1.14)	(-1.88)	(-0.83)
Target Tobin's Q	-0.0023	-0.0070	-0.0022	-0.0041
	(-0.70)	(-1.02)	(-1.16)	(-0.60)
Target Leverage	0.0256	0.0601	0.0343	0.1259
	(0.17)	(0.43)	(0.22)	(0.90)
Target Return on Assets	-1.1117**	-0.1511	-1.0954***	-0.0957
	(-2.46)	(-1.10)	(-2.67)	(-0.70)
Relative Deal Size	-0.1611	-0.0948	-0.1763	-0.1453
	(-1.64)	(-0.62)	(-1.45)	(-0.94)
Pure Stock Deal	-0.0665	-0.0621	-0.0660	0.0093
	(-0.56)	(-0.47)	(-0.46)	(0.07)
Hostile Takeover	0.2598	-0.4402	0.2522	-0.4897
	(0.43)	(-1.15)	(0.67)	(-1.28)
Competing Bid	-0.1631	-0.4524*	-0.1584	-0.3178
	(-0.66)	(-1.73)	(-0.47)	(-1.20)
Diversification	-0.1701	0.0182	-0.1565	0.0377
	(-1.49)	(0.16)	(-1.21)	(0.32)
Constant	-1.3494***	-0.4633	-1.3174**	0.5743
	(-3.63)	(-1.58)	(-2.32)	(1.14)
Year-fixed-effects	yes	yes	yes	yes
Industry-fixed-effects	yes	yes	yes	yes
Observations	341	341	341	341
Adjusted R2	0.074	0.037	0.083	0.068

Table 3.7 – Explanation of low premium for connected deals

Table 3.7 explores the reasons why acquisition premium is associated with social connection with three panels. Panel A shows univariate analysis for low premium in first-degree connected deals, which are further classified by directors having a position on the board of the acquisition partner. The board position is further divided into first-level (CEO; Chairman) and second-level (common director; independent director). A_higher position refers to interlocking directors that have a higher position on the acquirer board than on target board. A_same level position is defined as the interlocking director being the CEO/Chairman of both the acquirer and the target or being hired as a common director or independent director of both acquisition partners. T_higher position indicates that the interlocking director has a higher position (CEO/Chairman) in the acquirer than in the target. Panel B limits the sample to second-degree connected deals. In Panel B, the sample is classified by whether the target director is retained on the board of the combined firm after acquisition. Panel C lists multivariate analysis for low premium. Models 1 and 2 report regressions for deals with first-degree connections. The dependent variables are acquisition premium, defined as the offer price, as the log percentage difference from the target's share price four weeks before the M&A deal announcement (Baker et al., 2012). A_higher position is a dummy variable which equals one when the interlocking director has a higher board position in the acquirer than in the target, and is zero otherwise. A_same position is a dummy variable, which equals one when the interlocking director has the same level position in the acquirer as in the target, and is zero otherwise. Models 3 and 4 limit the sample to deals with second-degree connections. The independent variable is T_retain – a dummy variable which equals one when the target director is offered a board seat on the board of the combined firm. Models 2 and 4 control both year and industry fixed-effects. For brevity, the results of the industry and year dummies are not reported. Definitions of variables are listed in Appendix A. t-statistics are listed. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Panel A: Univariate Analysis for Premium in First-degree Connected Deals

	(1)	(2)	(3)	(4)	(2) - (4)	(3) - (4)	(2) - (3)
	First-degree connected	A_higher position	A_same level position	T_higher position			
premium	0.2559***	0.1149 ***	0.1762***	0.8876***	-0.7726***	-0.7113***	-0.0613
Observations	41	12	25	4			

Panel B: Univariate analysis for Premium in Second-degree Connected Deals

	(1)	(2)	(3)	(2) - (3)
	Second-degree connected	Retain	Non-retain	
premium	0.4241***	0.3972***	0.6696***	-0.2724**
Observations	87	37	50	

Panel C: Multivariate analysis for low premium

Acquisition Premium	Model 1	Model 2	Model 3	Model 4
A_higher position	-0.9529***	-1.1621***		
	(-3.82)	(-4.4)		
A_same level position	-0.7376**	-0.9173***		
	(-2.85)	(-3.48)		
T_retain			-0.3980***	-0.3781**
			(-3.02)	(-2.39)
Target 52-week High	0.3268*	-0.6231***	0.0526	0.0619
	(1.83)	(-3.49)	(0.62)	(0.66)
Acquirer Tobin's Q	0.0222	-0.0368	-0.0013	-0.0011
	(0.55)	(-0.77)	(0.695)	(-0.3)
Acquirer Market Value	-0.0144	-0.0248	-0.0431	-0.0608
	(-0.35)	(-0.61)	(-1.15)	(-1.38)
Acquirer Leverage	-0.5022	-0.4940	0.1691	0.1573
	(-1.51)	(-1.27)	(0.64)	(0.47)
Acquirer Return on Assets	0.9297	1.5851	0.4046	0.5474
	(0.66)	(0.9)	(0.82)	(0.87)
Target Tobin's Q	-0.0153	0.0110	-0.0049	-0.0052
	(-0.71)	(0.5)	(-0.67)	(-0.62)
Target Leverage	0.1819	0.4672	-1.3009***	-1.3595***
	(0.66)	(1.8)	(-5.76)	(-5.07)
Target Return on Assets	-0.6417*	-0.8316**	-2.7506***	-2.8399***
	(-1.74)	(-2.37)	(-7.85)	(-7.21)
Relative Deal Size	-0.27914	-2.4865**	-0.0595	-0.0486
	(-0.62)	(-2.64)	(-0.35)	(-0.24)
Pure Stock Deal	0.2563*	0.5962***	-0.2836*	-0.2975*
	(1.84)	(3.71)	(-1.95)	(-1.79)
Hostile Takeover	-0.0181	-0.008	0.3084	0.5726
	(-0.05)	(-0.02)	(0.46)	(0.61)
Competing Bid			0.0033	-0.1261
			(0.01)	(-0.28)
Diversification	-0.1076	-0.1718	0.1469	0.1804
	(-0.76)	(-1.29)	(1.1)	(1.11)
Constant	1.2351***	1.8769***	1.4868***	2.0921***
	(3.04)	(3.68)	(3.89)	(2.82)
Year-fixed-effects	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes
Observations	41	41	87	87
Adjusted R2	0.420	0.6473	0.601	0.650

Table 3.8 – Endogeneity test

Table 3.8 reports the endogeneity test – two stages least square (2sls) – for acquisition premium analysis. The instrument variable for social connection in Models 1 and 2 is previous social connection, which refers to a situation where acquirers and targets are socially connected three years before the takeover announcement. Similarly, the instrument variable for first-degree connection in Models 3 and 4 is previous first-degree connection, which describes whether a director simultaneously served on the acquirer and target boards three years before the announcement of the M&A deal. The instrument variable for second-degree connection in Model 3 and 4 is previous second-degree connection, which describes whether two individual board members, respectively from the acquirer and target, had social ties three years prior to the deal announcement. The acquisition premium is defined as the offer price, as the log percentage difference from the target's share price four weeks before the M&A deal announcement (Baker et al., 2012). Target 52-week high is defined as the target's highest stock price over the period from 365 days before to 30 days before the takeover announcement, denoted as the log percentage difference of the target stock price 30 days before the takeover announcement (Baker et al., 2012). A first-degree connection refers to a situation in which a board director or executive serves on both the acquiring and target firm boards during the deal announcement, while a second-degree connection is defined when two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background). Industry and year fixed effects are controlled. For brevity, the results for the industry and year dummies are not reported. Definitions of variables are listed in Appendix A. t-statistics are listed. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Acquisition Premium	Model 1		Model 2	
	First-stage	Second-stage	First-stage	Second-stage
Connection		-0.1839*		-0.1615*
		(-1.71)		(-1.69)
First-degree connection				
Second-degree connection				
Target 52-week High			-0.0063	0.7090***
			(-0.35)	(8.72)
Acquirer Tobin's Q	-0.0001	0.0016	-0.0001	0.0007
	(-0.17)	(0.77)	(-0.15)	(0.34)
Acquirer Market Value	0.0046	-0.0345**	0.0046	-0.0266*
	(1.36)	(-2.25)	(1.33)	(-1.72)
Acquirer Leverage	-0.06212***	-0.2618**	-0.0638***	-0.0673
	(-2.62)	(-2.46)	(-2.64)	(-0.62)
Acquirer Return on Assets	0.0311	-0.3825*	0.0288	-0.1365
	(0.63)	(-1.74)	(0.58)	(-0.61)
Target Tobin's Q	-0.0002	-0.0044**	-0.0002	-0.0040
	(-0.25)	(-1.65)	(-0.26)	(-1.48)
Target Leverage	-0.0089	-0.0535	-0.0090	-0.0342
	(-0.60)	(-0.82)	(-0.62)	(-0.52)
Target Return on Assets	0.0078	-0.4113***	0.0048	-0.1385
	(0.33)	(-3.84)	(0.19)	(-1.21)
Relative Deal Size	0.0026	-0.2886***	0.0024	-0.2609***
	(0.17)	(-4.18)	(0.15)	(-3.75)
Pure Stock Deal	0.0255*	-0.0548	0.0262*	-0.1203*
	(1.70)	(-0.81)	(1.72）	(-1.76)
Hostile Takeover	0.0530	-0.1818	0.0535	-0.2290
	(0.96)	(-0.73)	(0.96）	(-0.92)
Competing Bid	-0.0213	-0.0690	-0.0210	-0.1231
	(-0.67)	(-0.49)	(-0.66)	(-0.86)
Diversification	0.0002	0.0123	0.0003	-0.0025
	(0.01)	(0.20)	(0.02)	(-0.04)
Previous Connection (IV)	0.9528***		0.9529***	
	(40.50)		(40.48)	
Previous First-degree connection (IV)				
Previous Second-degree connection (IV)				
Constant	0.0223	-0.6770***	0.0254	-1.0298***
	(0.72)	(-4.89)	(0.79)	(-4.09)
Year-fixed-effects	Yes	Yes	Yes	Yes
Industry-fixed-effects	Yes	Yes	Yes	Yes
Observations	1072	1072	1072	1072
Adjusted R2	0.641	0.063	0.645	0.155

Acquisition Premium	Model 3			Model 4		
	First-stage		Second-stage	First-stage		Second-stage
Connection						
First-degree connection			-0.3768**			-0.3990**
			(-1.96)			(-2.14)
Second-degree connection			0.0440			0.0608
			(0.30)			(0.42)
Target 52-week High				0.0043	-0.0192	0.6307***
				(0.41)	(-1.00)	(7.40)
Acquirer Tobin's Q	0.0001	-0.0002	0.0010	0.0001	-0.0002	0.0006
	(0.10)	(-0.39)	(0.44)	(0.10)	(-0.37)	(0.30)
Acquirer Market Value	-0.0037*	0.0081**	-0.0389**	-0.0036*	0.0078**	-0.0291*
	(-1.89)	(2.27)	(-2.36)	(-1.85)	(2.17)	(-1.81)
Acquirer Leverage	-0.0068	-0.0337	-0.0128	-0.0064	-0.0359	0.0585
	(-0.45)	(-1.21)	(-0.10)	(-0.41)	(-1.28)	(0.47)
Acquirer Return on Assets	0.0349	-0.0018	-0.3948*	0.0364	-0.0086	-0.1713
	(1.29)	(-0.04)	(-1.75)	(1.33)	(-0.17)	(-0.77)
Target Tobin's Q	0.0001	-0.0003	-0.0042	0.0001	-0.0003	-0.0036
	(0.42)	(-0.45)	(-1.57)	(0.43)	(-0.49)	(-1.36)
Target Leverage	-0.0014	-0.0044	0.0085	-0.0014	-0.0044	0.0075
	(-0.17)	(-0.30)	(0.13)	(-0.17)	(-0.29)	(0.11)
Target Return on Assets	-0.0042	0.0189	-0.3809***	-0.0024	0.0108	-0.1135
	(-0.31)	(0.76)	(-3.38)	(-0.17)	(0.41)	(-0.98)
Relative Deal Size	-0.0073	0.0091	-0.2813***	-0.0072	0.0085	-0.2605***
	(-0.84)	(0.57)	(-3.85)	(-0.82)	(0.53)	(-3.67)
Pure Stock Deal	0.0149*	0.0147	-0.0358	0.0145*	0.0166	-0.0982
	(1.78)	(0.96)	(-0.51)	(1.72)	(1.08)	(-1.43)
Hostile Takeover	0.0612**	-0.0153	-0.2503	0.0611**	-0.0148	-0.2660

	(2.03)	(-0.28)	(-1.00)	(2.02)	(-0.27)	(-1.09)
Competing Bid	0.0134	-0.0367	-0.1038	0.0134	-0.0364	-0.1133
	(0.77)	(-1.16)	(-0.72)	(0.77)	(-1.15)	(-0.81)
Diversification	0.0080	-0.0166	0.0002	0.0080	-0.0164	-0.0062
	(1.06)	(-1.21)	(0.00)	(1.06)	(-1.19)	(-0.10)
Previous Connection (IV)						
Previous First-degree connection (IV)	0.9536***	-0.6895***		0.9534***	-0.6885***	
	(38.13)	(-15.08)		(38.10)	(-15.05)	
Previous Second-degree connection (IV)	0.0472***	0.8251***		0.0473***	0.8248***	
	(3.19)	(30.50)		(3.20)	(30.49)	
Constant	0.0172	-0.0290	-0.3517	0.0148	-0.0181	-0.7077***
	(0.64)	(-0.59)	(-1.57)	(0.54)	(-0.36)	(-3.17)
Year-fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1072	1072	1072	1072	1072	1072
Adjusted R2	0.675	0.523	0.117	0.675	0.523	0.164

Table 3.9 – Determinants of acquisition premium in CEO connections

Table 3.9 examines acquisition premium by adopting an alternative proxy – CEO connection. In all models, acquisition premium is regressed against dummy variables for social connection. Acquisition premium is defined as the offer price, as the log percentage difference from the target's share price four weeks before the M&A deal announcement (Baker et al., 2012). The independent variable in Models 1, 2 and 5 is CEO connection, which is equal to one if either the acquirer or target CEO connects the two merging firms. The dependent variables in Models 3, 4 and 6 are CEO first-degree connection and CEO second-degree connection. A CEO first-degree connection is defined as when an acquirer CEO (target CEO) also serves on the board of the target (acquirer board member) or as an executive. CEO second-degree connection happens when acquirer or target CEOs share past experience with board members or executives in the counterpart firm. Furthermore, the target's 52-week high reference point (Baker et al., 2012) in Models 2 and 4 is defined as the target's highest stock price over the period from 365 days before to 30 days before the takeover announcement, denoted as the log percentage difference of target stock price 30 days before the takeover announcement (Baker et al., 2012). In Models 5 and 6, the full sample is split into three groups (low, medium, high) based on the target 52-week high and shows the multivariate analysis of premiums in the low/high target 52-week high subsample. For brevity, results for the industry and year dummies are not reported. Definitions of variables are listed in Appendix A. t-statistics are listed. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Acquisition Premium	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**		**Model 6**	
					Low	**High**	**Low**	**High**
CEO connection	-0.3610**	-0.3543**			0.0664	-0.8507***		
	(-2.50)	(-2.37)			(0.24)	(-2.71)		
CEO First-degree connection			-0.7264***	-0.7545***			-0.5519	-1.0470***
			(-3.35)	(-3.54)			(-0.97)	(-2.77)
CEO Second-degree connection			-0.0821	-0.0486			0.3644	-0.6352
			(-0.48)	(-0.27)			(1.47)	(-1.31)
Target 52-week high		0.6229***		0.6295***				
		(6.53)		(6.55)				
Acquirer Tobin's Q	0.0009	0.0006	0.0010	0.0007	0.0158*	-0.0002	0.0152*	-0.0001
	(0.90)	(0.65)	(0.98)	(0.74)	(1.71)	(-0.08)	(1.67)	(-0.06)
Acquirer Market Value	-0.0347**	-0.0246	-0.0382**	-0.0284*	0.0439	-0.0459	0.0379	-0.0487

	(-2.03)	(-1.46)	(-2.26)	(-1.70)	(1.44)	(-1.48)	(1.25)	(-1.57)
Acquirer Leverage	-0.0149	0.0557	-0.0300	0.0399	0.0284	0.1673	0.0304	0.1531
	(-0.12)	(0.47)	(-0.24)	(0.34)	(0.14)	(0.68)	(0.15)	(0.62)
Acquirer Return on Assets	-0.4065	-0.1879	-0.4041	-0.1830	-0.8728**	-0.2236	-0.8608**	-0.2189
	(-1.45)	(-0.71)	(-1.44)	(-0.69)	(-2.19)	(-0.63)	(-2.17)	(-0.61)
Target Tobin's Q	-0.0044**	-0.0038*	-0.0043**	-0.0036*	-0.0025**	-0.0057	-0.0024*	-0.0056
	(-2.38)	(-1.93)	(-2.33)	(-1.88)	(-1.91)	(-1.59)	(-1.90)	(-1.58)
Target Leverage	0.0097	0.0087	0.0110	0.0102	0.0493	0.1080	0.0637	0.1097
	(0.17)	(0.17)	(0.19)	(0.19)	(0.36)	(0.69)	(0.46)	(0.70)
Target Return on Assets	-0.3731*	-0.1088	-0.3779*	-0.1112	-1.2677***	-0.1572	-1.3082***	-0.1557
	(-1.75)	(-0.56)	(-1.75)	(-0.57)	(-2.93)	(-0.71)	(-3.00)	(-0.70)
Relative Deal Size	-0.2715***	-0.2497***	-0.2827***	-0.2617***	-0.1523	-0.1194	-0.1684	-0.1254
	(-3.34)	(-3.29)	(-3.47)	(-3.44)	(-1.40)	(-0.81)	(-1.54)	(-0.84)
Pure Stock Deal	-0.0222	-0.0841	-0.0257	-0.0886	-0.0821	0.0620	-0.0790	0.0587
	(-0.31)	(-1.18)	(-0.36)	(-1.24)	(-0.59)	(0.44)	(-0.57)	(0.42)
Hostile Takeover	-0.2502	-0.2671	-0.2716	-0.2907	0.3078	-0.4836	0.2986	-0.5233
	(-1.05)	(-1.11)	(-1.18)	(-1.24)	(1.03)	(-0.90)	(1.04)	(-0.99)
Competing Bid	-0.1127	-0.1221	-0.1100	-0.1193	-0.1888	-0.3630	-0.1893	-0.3576
	(-0.64)	(-0.70)	(-0.62)	(-0.68)	(-0.60)	(-1.16)	(-0.61)	(-1.15)
Diversification	-0.0053	-0.0118	-0.0060	-0.0126	-0.1509	0.0170	-0.1488	0.0136
	(-0.08)	(-0.19)	(-0.09)	(-0.20)	(-1.19)	(0.13)	(-1.18)	(0.10)
Constant	-0.3841	-0.7384***	-0.3563	-0.7117***	-1.4344***	0.5364*	-1.3863**	0.5588*
	(-1.44)	(-2.76)	(-1.34)	(-2.66)	(-2.62)	(1.80)	(-2.56)	(1.85)
Year-fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind.-fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1072	1072	1072	1072	341	341	341	341
Adjusted R2	0.113	0.159	0.117	0.163	0.087	0.059	0.094	0.058

Table 3.10 – Takeover Timing Analysis

Table 3.10 tabulates the average acquirer stock run-up in non-connected deals and connected deals, including first-degree and second-degree connected deals. A first-degree connection refers to a situation in which a board director or executive serves on both acquiring and target firm boards during the deal announcement, while a second-degree connection is defined when two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background). Acquirer stock run-up is defined as the bidders' buy-and-hold returns over the period starting 200 trading days and ending 2 months prior to the deal announcement (Cai & Sevilir, 2012). ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

	Full Sample (1)	**Connected deals (2)**	**First-degree connected (3)**	**Second-degree connected (4)**	**Non-connected deals (5)**	**(2) - (5)**	**(3) - (5)**	**(4) - (5)**	**(3) - (4)**
Acquirer run-up	0.0976***	0.1643***	0.2844**	0.1078***	0.0888***	0.07553**	0.1956***	0.0190843	0.1766*
Observations	1072	128	41	116	944				

Table 3.11 –Method of Payment

Table 3.11 reports the logit regression on the method of payment. The dependent variable in all models is the stock dummy, which is equal to one if the takeover transaction is fully financed with stock. The independent variable in Models 1, 2 and 3 is connection, which is equal to one if the acquirers are socially connected with targets. The dependent variable in Models 4, 5 and 6 is first-degree connection. The dependent variable in Models 7, 8 and 9 is second-degree connection. A first-degree connection refers to a situation in which a board director or executive serves on both the acquiring and target firm boards during the deal announcement, while a second-degree connection is defined when two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background). Further, industry and year fixed effects are controlled in Model 3, 6 and 9. For brevity, results for the industry and year dummies are not reported. Definitions of variables are listed in Appendix A. t-statistics are listed. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

Payment method – Stock	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
Connection	0.7824***	0.9119***	1.2383***						
	(3.97)	(4.27)	(5.25)						
First-degree connection				1.0191***	0.9121***	1.1559***			
				(3.17)	(2.63)	(3.14)			
Second-degree connection							0.5803**	0.8268***	1.1299***
							(2.46)	(3.23)	(4.00)
Acquirer stock Run-up		0.6403***	0.6005***		0.6449***	0.6314**		0.6812***	0.6596***
		(3.28)	(2.78)		(3.30)	(2.93)		(3.55)	(3.15)
Target 52-week High		0.6951***	1.0368***		0.7009***	1.0298***		0.7278***	1.0692***
		(3.74)	(4.61)		(3.79)	(4.62)		(3.95)	(4.78)
Acquirer Market Value		-0.2017***	-0.1437***		-0.1794***	-0.1196***		-0.2023***	-0.1482***
		(-4.98)	(-3.31)		(-4.49)	(-2.79)		(-4.99)	(-3.42)
Relative Deal Size		0.1579	0.3226*		0.2088	0.3910**		0.1560	0.2996
		(0.91)	(1.67)		(1.23)	(2.06)		(0.91)	(1.55)
Diversification		-0.1927	-0.0435		-0.2014	-0.0489		-0.1803	-0.01128
		(-1.13)	(-0.23)		(-1.19)	(-0.27)		(-1.06)	(-0.06)
Hostile Takeover		-0.8770	-0.7332		-0.8760	-0.7806		-0.8376	-0.6186
		(-1.11)	(-0.88)		(-1.11)	(-0.94)		(-1.06)	(-0.78)
Constant	-1.2271***	0.0228	-1.6098*	-1.1657***	-0.0850	-1.7778**	-1.1717***	0.0568	-1.5973*
	(-15.79)	(0.06)	(-1.89)	(-15.93)	(-0.24)	(-2.09)	(-15.63)	(0.16)	(-1.88)
Year-fixed-effects	No	No	Yes	No	No	Yes	No	No	Yes
Industry-fixed-effects	No	No	Yes	No	No	Yes	No	No	Yes
Observations	1072	1072	1072	1072	1072	1072	1072	1072	1072
Adjusted R2	0.013	0.073	0.149	0.008	0.064	0.134	0.005	0.067	0.149

3.7 Appendix A

Variables	Definitions	Source
Panel A: Dependent Variables		
Acquisition premium	Acquisition premium is defined as the offer price, as the log percentage difference from target's share price four weeks before the M&A deal announcement (Baker et al., 2012).	CRSP/Thomson ONE
Panel B: Key independent variables		
Connection	Dummy variable that equals 1 if acquirer and target are socially tied with either first-degree or second-degree connection.	BoardEx
First-degree connection	Dummy variable that equals 1 if board director or executive serves on both acquiring and target firm boards during deal announcement.	BoardEx
Second-degree connection	Dummy variable that equals 1 if two individuals, respectively from the acquirer and target firm, have social ties through past experience (such as employment history or educational background).	BoardEx
CEO connection	Dummy variable that equals 1 if either acquirer or target CEO connects the two merging firms.	BoardEx
CEO first-degree connection	Dummy variable that equals 1 if acquirer CEO (target CEO) also serves as a target board member (acquirer board member) or management.	BoardEx
CEO second-degree connection	Dummy variable that equals 1 if acquirer or target CEO shares past experience with board members or executives in the counterpart firm.	BoardEx
Board connection	Dummy variable that equals 1 if board members connect bidder with target.	BoardEx
Board first-degree connection	Dummy variable that equals 1 if bidding firm and target share same board member.	BoardEx
Board second-degree connection	Dummy variable that equals 1 if two individuals respectively from acquirer and target boards have social ties through past experience.	BoardEx
Higher level positions for Acquirer (Target)	Dummy variable that equals 1 if interlocking director holds a more important position in acquirer (target) than in target (acquirer) respectively while same level position indicates that directors serve as same level position in both acquisition partners	BoardEx
T_retain	Dummy variable that equals 1 if target director is offered a board seat in combined firm after acquisition.	BoardEx
Panel C: Firm characteristics		
Tobin's Q	Tobin's Q is computed as the ratio of market value four weeks before takeover announcement over book value of the company's assets.	COMPUSTAT
Market Value (MV)	The market value is calculated as the number of shares outstanding multiplied by the respective stock price at four weeks before the official deal announcement.	CRSP

Leverage	Leverage ratio is total debt, which is the sum of long-term debt and short-term debt, divided by firm's total asset.	COMPUSTAT
Return on Assets (ROA)	ROA is computed as ratio of company's net income by book value of total assets.	COMPUSTAT
	Panel D: Deal characteristics	
Transaction value (USD millions)	Transaction value is total value paid by acquirer in order to obtain target, which is denoted in total dollar value as reported by Thomson ONE.	Thomson ONE
Relative Deal Size	Relative deal size is calculated as transaction value divided by market capitalisation of the acquirer, four weeks before takeover announcement.	Thomson ONE
Hostile Takeover	Dummy variable that equals 1 if M&A deal is reported as hostile.	Thomson ONE
Competing Bid	Dummy variable that equals 1 if M&A deal involves multiple bidding firms.	Thomson ONE
Pure Cash Deal (Cash)	Dummy variable that equals 1 if M&A deal is paid fully by cash.	Thomson ONE
Pure Stock Deal (Stock)	Dummy variable that equals 1 if M&A deal is paid fully by stocks.	Thomson ONE
Target 52-week High (%)	Target 52-week high is defined as target's highest stock price over period from 365 days before to 30 days before takeover announcement, denoted as log percentage difference of target stock price 30 days before takeover announcement (Baker et al., 2012).	CRSP
Acquirer Stock Price Run-up	Acquirer stock price run-up is bidders' buy-and-hold returns over period starting 200 trading days and ending 2 months prior to deal announcement (Cai & Sevilir, 2012).	CRSP

Chapter 4: Investment banking friends

4.1 Introduction

Boutique advisors are non-full-service advisors, providing expertise in certain industries (such as technology or healthcare) or corporate finance (such as mergers and acquisition or restructuring). In recent years, boutique investment banks have burgeoned in the global M&A advisory market to capture more than 40% of global M&A advisory revenue, especially in the aftermath of the 2007 financial crisis.[19] Global boutique banks,[20] such as Lazard, Evercore Partners Inc and Centerview Partners, were among the top 10 M&A advisors[21] based on total deal value advised in the US market in 2015 and 2016. The development of boutique advisors has attracted the considerable attention of media, investors and potential clients. However, few academic have studied the role of boutique banks as M&A advisors. To the best of the author's knowledge, Song et al. (2013) were first to shed light on boutique advisors and examine acquisition performance when either full-service[22] or boutique investment banks are involved. However, Song et al. (2013) examine preliminary differences between full-service and boutique banks and do not explore the reasons why acquiring firms choose boutique advisors. This chapter introduces the social network theory and re-evaluates the in-depth differences between full-service and boutique banks in the advisor-selection process and takeover

[19] See *Financial Times*, Jan 24th 2017, "Boutique advisors maintain appeal despite big bank criticism".
[20] Global boutique advisors are identified if the boutique investment banks provide international services and describe their business scale as being global on their official website, while domestic boutique advisors focus on the US and regional markets.
[21] See Investment banking scorecard, released by the *Wall Street Journal*; data provided by Dealogic.
[22] Consistent with Song et al. (2013), a full-service advisor refers to an investment banker who engages in full-line financial services including trading, underwriting, M&A advisory, security and debt services.

outcomes.

In fact, hundreds of financial advisors[23] exist in this competitive investment banking market, where full-service banks account for a small proportion. The rest – a large number of competitors – are boutique advisors, among which global boutique advisors have a great advantage in resources and reputation over regional boutique banks. The fierce competition for M&A advisory business is not equal due to the gap in resources and abilities between full-service banks and boutique banks, especially domestic boutique advisors. Investment banks have various channels and incentives to "win" and negotiate takeover deals. As the report *"Battle for dominance in M&A advisory business bulge-brackets vs. the boutique"* stated, "M&A advisory is a relationship-driven business – one that thrives on trust and longstanding ties." This shows that takeover transactions are driven by the relationship between client firm and banks. Social network plays a vital role in pursuing M&A business also and affects the acquisition process as well as performance. Therefore, the combination of investment bank studies and social network theory deserves more emphasis.

This chapter explores the impact of acquirer-advisor connection on takeover deals advised by either boutique investment banks or full-service banks. By introducing social connection, this study provides a new perspective to examine the difference between boutique and full-service advisors. Specifically, the full acquisition sample is divided into takeover deals involved with full-service banks and deals advised by boutique banks. This chapter investigates the role of social connection in the advisor-selection process, acquisition premium, announcement return and long-run

[23] The number of investment banks covered in the Thomson One database is more than 120, checked with customer service in Thomson One database.

post-acquisition performance by comparing the connection effect in deals involved with full-service banks and deals advised by boutique banks. Herein, social connection refers to a direct board connection between acquirers and investment banks, which are classified as either first-degree or second-degree connections based on the data from the BoardEx database. First-degree connection, known as board interlock, is defined as board members in bidding firms also serving on the board of their M&A advisors during the announcement period. Second-degree connection refers to two individuals, respectively from an acquirer and an advisor, working together on a third board during the takeover announcement period.

Previous literature on social network shows that interfirm social ties positively affect business activities and corporate decisions in two ways: information advantage and enhanced monitoring. On one hand, social connection improves the information flow transferred between firms, reduces information asymmetry and saves on costs obtaining information, especially when intra-firm connection via personal links is much closer and more high-quality (Cohen et al., 2008; Engelberg et al., 2012; Hochberg et al., 2007; Mol, 2001; Schonlau & Singh, 2009; Uzzi, 1999). On the other hand, connected directors may play a monitoring role in investment decisions attributed to directors' responsibilities, which maximises shareholder value. Strict monitoring from connected directors could alleviate concerns around agency conflicts (Engelberg et al., 2012). However, social connection may cause issues, such as familiarity bias and social conformity, leading to mixed results from performance and investment decisions (Cao et al., 2009; Chen et al., 2014; Cialdini & Goldstein, 2004; Cooney et al., 2015; Gaspar & Massa, 2007); Chen et al., 2014). For example, firms are more likely to do business with people they know (Chen et al., 2014; Cooney et al., 2015).

This chapter then analyses the distinction between boutique and full-service M&A advisors and develops a hypothesis by incorporating the social connection theory. According to Song et al. (2013), full-service advisor refers to investment bankers who engage in full-line financial services including trading, underwriting, M&A advisory, security and debt services. Boutique advisors are non-full-service advisors, providing expertise in certain industries (such as technology, healthcare, etc.) or corporate finance (such as mergers and acquisition, restructuring, etc.) There are three major differences between boutique and full-service banks: size and popularity; independence; and experience and expertise (Song et al., 2013).

First, compared with full-service banks, the majority of boutique advisors are small and relatively unknown, except for few global boutique advisors (for example, Lazard, Evercore, Rothschild, etc.). Competition is fierce and intense in the investment banking market due to the existence of a larger number of rivals, the similar services provided, endogenous entry and the existence of "soft" competition.[24] Therefore, investment banks have a strong incentive to establish and maintain firm-banking relationships in order to get business, especially profitable M&A deals (Anand & Galetovic, 2006). Domestic boutique banks, who focus on US and regional markets, may rely more on relationships built via social networks to pursue M&A business. Domestic boutique advisors are generally not known by most potential clients and may not be able to afford large marketing and advertising expenses. Hence, social network through personal linkage becomes an important channel for domestic advisors to win M&A business. Moreover, the social network theory indicates that firms are willing to bring a "friend" or "someone they know"

[24] "Soft" competition refers to non-price competition.

into the business due to familiarity. Therefore, our "friends in business" hypothesis is that acquirers are more likely to hire connected boutique banks, and especially domestic boutique banks, as their M&A advisors.

Second, boutique advisors label themselves as independent banks, therefore resulting in fewer agency problems between acquisition partners and boutique banks. Kosnik and Shapiro (1997) indicate that firm-banking agency conflicts are caused by information asymmetry between acquisition partners and investment banks, as well as the duration of the relationship. The agency problem is more severe when deals involve greater information asymmetry and a shorter duration of firm-banking relationship. Investment banks, especially full-service banks, have great advantages in terms of information, experience, and social network and therefore have more power over acquisition partners in identifying targets or acquirer candidates and negotiating during the bidding process. The imbalance of information and power leads to potential agency conflicts. Hence, bidding firms who hire full-service advisors are expected to suffer more information asymmetry and conflicts of interest than firms who appoint boutique M&A advisors. Since full-service investment banks have a large and diverse social network, acquirers' full-service advisors may also have relation with target firms. In deals with target "friends," full-service banks may serve the interests of the combined entity of acquirers and targets rather than solely maximise acquirers' interests. Therefore, this chapter expects that social connection with full-service banks may result in more agency problems between acquirers and full-service advisors, leading to less favourable outcomes for acquiring firms (agency conflict hypothesis part 1).

According to Kosnik and Shapiro (1997), agency problems could be alleviated by

reducing information asymmetry and building the firm-banking relationships beyond single transactions. Previous studies on social network have shown that the presence of social connection could enhance information transfer and reduce information asymmetry between connected firms. Moreover, the duration of the personal network is not confined to the acquisition period and could extend beyond deal completion. Therefore, this chapter conjectures that connection with investment banks could efficiently improve agency problems and therefore deliver better takeover transactions, especially in deals advised by boutique banks (agency conflict hypothesis part 2). Moreover, boutique advisors, especially domestic boutique banks, have a stronger incentive to negotiate more favourable deal terms for their client firms in order to maintain long-run relationships and obtain more business in the future.

Third, boutique advisors generally specialise in M&A advisory business or services in certain industries (such as technology, healthcare, media, etc.) while full-service banks provide full-line financial services, including equity issuance, debt issuance, M&A advisory, and trading. Therefore, full-service banks which are socially connected with acquirers may also have relations with target firms through previous business. According to Fernando, May, and Megginson (2012), firm-banking relationships built via equity and debt issuance are more valuable to investment banks than relationships generated in M&A, since the information obtained in the M&A transactions may lose value after takeover deals are completed. Therefore, connected full-service banks may act against the interest of bidding firms. The issue of multiple firm-banking relations is less likely to occur in deals with boutique advisors. Therefore, boutique advisors would value the existing network and serve the interests of bidding firms; acquirers who have a social connection with boutique

advisors are expected to achieve better acquisition performance than acquirers without social linkage in deals involving boutique banks.

To check the expectations of social connection effects on deals advised by full-service or boutique advisors, this study uses the full sample of US acquisitions announced in the last ten years ranging from 2005 to 2016. The status of sample deals is either completed or withdrawn. Due to the specialty of the financial industry, both bidders and targets are non-financial companies in our sample. This chapter also requires all bidding firms to be publicly listed, and to hire financial advisors in their takeover transactions.

To ensure that the empirical evidence on social connection is not biased by the previous business connection between firms and investment banks, this chapter excludes deals in which acquirers retain IPO underwriters, debt issuers, SEO issuers and advisors in previous takeover transactions. The final sample consists of 1,565 deals, of which 471 are public transactions and 1,094 are private acquisitions.[25] Some 625 acquirers (39.94%) invite boutique banks to be their advisors (hereinafter referred to as boutique deals) while 940 deals involve full-service banks (hereinafter referred to as full-service deals). In 625 boutique deals, 9.44% are connected deals in which the bidders and boutique banks have a social connection. In 30 boutique connected deals, acquirers are linked with boutique bankers by first-degree connections in which a board member in the acquirer concurrently works on the board of the boutique advisor during the takeover announcement. There are 29 deals with second-degree connections, in which two individuals, respectively from the

[25] In public acquisitions, both bidders and targets are publicly listed firms while in private acquisitions the target can be either public or private.

acquirer and the boutique advisor, serve together on a third board when the takeover bid is announced. In contrast, in the subsample of full-service deals, there are 41 (4.37%) observations in which investment bankers have board ties with acquiring firms. Among the full-service sample, 19 transactions are first-degree connected deals, and 21 deals involve second-degree connections.

This study first analyses how social connection with boutique banks (full-service banks) affects acquirers' advisor selection process. This chapter follows Bouwman (2011) and revises the director-selection logit model to adjust for our advisor-selection analysis. For each takeover deal, a list of potential advisor candidates is formed, including both the M&A advisors selected and the top 100 most active investment banks[26] (including full-service and boutique banks) ranked by number of deals and total transaction value advised over the sample period from 2005 to 2016. Consistent with our hypothesis, a first-degree connection between acquirers and boutique advisors, especially domestic boutique banks, significantly increases the likelihood of being chosen. The probability of acquirers hiring connected domestic boutique advisors is 4.76 times the probability of not being chosen, suggesting that social connections help domestic boutique banks to secure M&A business. Moreover, acquirers are found to consider connection when selecting M&A advisors. However, second-degree connections between boutique banks and bidders are significantly and negatively associated with the probability of being selected, which can be explained by the independent board position of connected directors in acquiring firms and (or) in boutique banks. However, in full-service deals, bidding firms are less likely to hire socially connected full-service banks,

[26] Following Q. Huang, Jiang, Lie, and Yang (2014), the top 100 most active advisors are ranked by the number of deals and aggregate transaction value over the sample period.

regardless of the connection types. The strong and negative relationship in full-service deals can be explained by two reasons. First, the majority of connected directors serve as independent board directors in acquirers and (or) full-service banks. Second, bidding firms may recognise that there are more agency conflicts between themselves and connected full-service banks and therefore avoid hiring connected full-service banks.

Next, this study examines the relationship between social connection and acquisition premium in boutique deals and full-service transactions. The acquisition premium for public deals is obtained from Thomson One while the premium for private takeover is calculated by following Officer (2007). The results show that in the sample of boutique deals, the coefficient for first-degree connection is negative and is statistically significant at 1%. In full-service acquisitions, both first-degree connection and second-degree connection are significantly and positively associated with acquisition premium. The findings support the "agency conflict hypothesis" that connected boutique advisors may serve in the acquirers' interest and negotiate lower acquisition premiums than non-connected boutique banks. However, acquirers connected with full-service banks pay a higher premium than firms with non-connected ones. A possible explanation is that connected full-service advisors know target firms and therefore act against the interest of bidding firms.

Then, this chapter investigates the effect of social connection on short-run performance with the sample of deals advised by either boutique banks or full-service advisors. Short-run performance is estimated using the five-day announcement return of bidding firms (ACAR (-2, +2)), targets (TCAR (-2, +2)) and the combined entity of bidders and targets (CCAR (-2, +2)). This study finds no

strong relationship between social connection and acquirers' announcement return in either boutique deals or full-service deals. However, the first-degree connection between bidders and full-service advisors significantly increase targets' announcement return and the announcement return of the combined entity. The positive relationship with targets' announcement performance may be attributed to the prior client relation with target firms. The announcement return of combined firms is the value-weighted average of acquirers' announcement return and targets' announcement return. Therefore, first-degree connection with full-service banks delivers acquisition synergies for combined entities, implying that connected full-service banks may consider the interests of both acquirers and targets rather than just the acquirers' own interests. These findings support our "agency conflicts" that connected full-service banks may act against the acquirers' interest while domestic boutique advisors closely connected with bidders serve the interests of client firms.

Additionally, this study evaluates the role of social connection with boutique advisors or full-service banks by analysing bidders' long-run stock and operating performance, measured by buy-and-hold abnormal return (BHAR), industry-adjusted return on assets (IAROA) and cash flow performance. The results indicate that acquirers who have a first-degree connection show a higher stock return in boutique deals when the buy-and-holding period is less than 12 months. Moreover, bidders closely connected with boutique advisors outperform non-connected firms in post-acquisition operating and cash flow performance. However, the effect of social connection is negative and significant on buy-and-hold return in full-service deals. The negative influence on stock performance lasts for as long as 36 months after takeover announcement. No significant relationship is observed between social connection and acquirers' operating performance, gauged by industry-adjusted ROA.

Moreover, acquirers' cash flow performance is improved in deals in which the acquiring firms are socially connected with boutique advisors while a social connection with full-service banks reduces the cash flow return for the fiscal year following the acquisition. Overall, acquirers benefit from social connection, especially first-degree connections, with boutique advisors in terms of post-acquisition performance while the presence of a close relationship reduces deal quality in deals advised by full-service banks. The long-run performance analysis provides further evidence that connected boutique advisors maximise acquirers' interests and deliver more favourable deals to connected bidding firms. Additionally, this study confirms the "boutique skill" hypothesis that connected boutique banks offer better takeover deals to acquirers than non-connected ones.

This chapter contributes to the current M&A literature in the following ways. First, the study adds a dimension of sociology regarding firm-banking relationships and provides new evidence on the choice of an advisor from the bankers' perspective. In past M&A studies, the firm-banking relationship has generally emerged from previous equity/debt issuance or takeover transactions and affects whether previous advisors are retained in the current deal. M&A studies on former business relationships assume that the selection of advisors is determined by acquisition partners and neglects the endeavours undertaken by banks to promote and win M&A advisory business. In particular, a previous business relationship presents an insufficient explanation for deals involving boutique investment banks, which are generally smaller, more independent and less well known. This chapter is the first to interpret acquirers' choice of M&A advisor by introducing social ties between bidders and investment banks and certifies that personal linkage does assist these boutique advisors in gaining M&A advisory business.

Second, this chapter contributes to current M&A studies by addressing boutique advisors. Currently, the rise of boutique investment banks has attracted the significant attention of corporations and media, especially after the 2007 financial crisis. Boutique advisors[27] have captured a large market share of M&A advisory revenue, and more than 40% of advisory revenue in the global market. Additionally, many large firms – both acquirers and targets – choose to employ boutique investment banks for their acquisition attempts. For example, in Kraft Foods' acquisition of H.J Heinz (value at $36.6 billion) in 2015, Kraft Foods (the acquirer) hired Centerview Partners LLC (boutique) while H.J Heinz's advisor was Lazard (boutique). Boutique investment banks also appeared in the advisory team in the Shell Oil – BG group deal and Verizon's acquisition of Yahoo. Therefore, research on boutique advisors deserves great emphasis and provides valuable findings for both theory and practice. However, few academic studies have shed light on the choice of boutique advisor in acquisitions, especially for large takeover deals. Song et al. (2013) investigate the influence of boutique investment banks on acquisition performance and analyse the choice of boutique advisors by examining deal characteristics. However, Song et al. (2013) address the preliminary and general differences between boutique and full-service investment banks and do not analyse the incentive for firms to select boutique advisors. This chapter revisits this difference in-depth by introducing social network and corporate governance and provides complementary evidence to previous studies on boutique investment banks.

This chapter also contributes to the literature by examining the role of social connection in determining corporate investment and economic outcomes. Previous

[27] See *Financial Times*, Jan 24th, 2017, "Boutique advisors maintain appeal despite big bank criticism".

studies have explored the relationship between firms and financial institutions, such as commercial banks and venture capital firms, suggesting that social connection in important for firm performance. Investment banks, as professional financial intermediaries, have significant effects on identifying acquisition candidates and negotiating takeover premiums. However, social connection between firms and investment banks is ignored in the current literature. This chapter fills this research gap by concentrating on mergers and acquisitions (M&As) performance when acquirers have social ties with investment banks, especially boutique advisors (Anand & Galetovic, 2006).

The remainder of this chapter is organised as follows: Section 2 summarises the previous literature relating to this chapter; Section 3 develops the hypotheses; Section 4 describes the data used in this study, the measurement of social connection, the classification of boutique and full-service investment bankers and descriptive statistics; Section 5 presents the empirical results; and Section 6 concludes the research.

4.2 Literature review

4.2.1 Boutique banks vs. Full-service banks

Song et al. (2013) are the first to devote their attention to boutique M&A advisors and compare the impact of boutique and full-service advisors in takeover deals announced between 1995 and 2006. Their findings indicate that acquisition partners are more likely to appoint boutique investment banks as M&A advisors in complex deals, suggesting that boutique banks are superior in terms of M&A expertise and skills in particular industries. Moreover, acquirers benefit from boutique advisors by

paying a lower acquisition premium. Deals involving boutique advisors take a longer time to complete, indicating that boutique advisors make more effort to negotiate better takeover terms. Golubov, Petmezas, and Travlos (2012) examine the effect of boutique investment banks in mergers and acquisitions and find no strong relationship with acquirers' announcement return, advisory fees and the probability of deal completion.

4.2.2 Agency conflicts between firms and investment banks

Kosnik and Shapiro (1997) show that third-party representation raises agency conflict issues. In order to gain commission and publicity, financial advisors may promote the completion of deals rather than negotiate favourable deal items for clients. M&A account for a large portion of investment banking revenues and can often feature agency problems between investment banks and acquisition partners. Kosnik and Shapiro (1997) indicate that agency conflicts arise due to information asymmetry and the duration of the relationship between investment banks and acquisition partners. Investment banks have a significant advantage in terms of information, experience, and expertise, as well as network. Investment banks have more power over firms in identifying target/acquirer candidates and the bidding process, resulting in possible conflicts of interests. As the investment banking market is more competitive, it becomes harder to maintain long-term single firm-banking relationships. Therefore, investment banks are more likely to pursue their self-interests and push for the successful completion of takeover transactions regardless of deal quality and long-run post-acquisition performance. Regarding the

causes[28] of conflicts, Kosnik and Shapiro (1997) propose four methods to mitigate agency problems. The first and main way is to reduce information asymmetry between firms and advisors by increasing in-house M&A experience and network resources, etc. Agency conflicts can also be reduced by building a long-run firm-advisor relationship, increasing discipline and public disclosure of advisors' performance, and designing contracts based on long-run takeover outcomes as well as improving the accountability of M&A advisors.

4.2.3 Firm-banking relationship

Firm-banking relationships can vary greatly depending on how each relationship is established. In previous M&A literature, the client-banking relationship is built on previous equity or debt issuance and takeover transactions. These studies emphasise whether acquirers/targets retain their previous M&A advisor from recent deals and its impact (Becher, Gordon, & Juergens, 2015; Forte, Iannotta, & Navone, 2010; Francis, Hasan, & Sun, 2014; French, Yan, & Yasuda, 2016; Saunders & Srinivasan, 2001).

Relationship banking is widely explored in the literature on commercial banks (lending/credit relationship) and underwriters (IPO). Boot (2000) summarises the previous literature on relationship banking and provide a brief overview of the definition, advantage, and disadvantage of firm-banking relationships. Commercial banks or investment banks establish relationships with corporate clients by offering financial services or advising transactions over time. Due to multiple interactions with firms, banks usually capture confidential, reusable and high-quality information,

[28] Kosnik and Shapiro (1997) indicate that agency conflicts arise due to information asymmetry and the duration of the relationship between investment banks and acquisition partners.

which is unavailable to markets. Organisations could benefit from banking relationships by mitigating the information asymmetry and agency conflicts that can occur in financial transactions, and by receiving monitoring and certification from their banking partner. However, banking relationships raise two issues: the "soft-budget" problem and the "locked-in" problem. The soft-budget problem refers to the situation where relationship banks may keep providing loan or credit to firms which are not qualified or even potentially default, resulting in a loss for banks. A "locked-in" single firm-banking relationship may lead to worse deal terms (such as higher advisory/underwriting fees, or higher loan interest), attributed to banks' information monopoly.

Fernando, May, and Megginson (2012) shed light on the advisor relationship by examining the effect of Lehman Brothers' bankruptcy on debt, equity underwriting and takeover clients. Firms with an equity underwriting relationship suffered a greater loss from the collapse of Lehman Brothers than the clients of other investment banks, as measured by abnormal returns around the announcement. The response of equity underwriting clients advised by Lehman Brothers is more negative. Firms that offer a variety of financial services earn more negative abnormal returns than clients with a single type of banking relationship. The results indicate that a stronger and broader banking relationship generates a greater influence on clients.

Becher et al. (2015) investigate the value of firm-advisor relationship and the consequence of retaining advisors who previously served in firms' debt, equity or takeover deals. The results reveal that firms perceive no benefits from maintaining long-term relationships, especially with IPO underwriters and merger advisors.

Compared with multiple banking relationships, firms that keep single advisors for entire transactions face an increase in advisory fees, reduced analyst coverage and deterioration in terms of deal contracts. However, due to concerns over information leakage to rivals, corporates are prone to maintain relationships with particular advisors over the long run.

Saunders and Srinivasan (2001) devote their attention to the role of investment banking relationships in advisory fees with a sample of successful US acquisitions announcing and completing between 1985 and 1998. The banking relationship is defined when the current merger advisor is involved in the acquirers' previous debt, equity or takeover transactions. Compared with advisors with no banking relationship, investment banks with previous business connections charge acquirers a higher advisory fee but do not deliver higher bidder announcement return. The paper infers that acquiring firms may be compensated by indirect no-fees benefits from a banking relationship. Switching costs may also be taken into account when an acquirer chooses to retain their previous advisor. This paper is among the first to relate banking relationship to M&A researchers. However, the results do not clearly identify the reason why bidders are willing to retain previously connected advisors. The measurement of a banking relationship is restricted to past transactions. Moreover, merger fees are only part of M&A studies.

Forte et al. (2010) use a sample of European acquisitions from 1994 to 2003 and investigate the choice of investment bankers from the targets' perspective. Specifically, they examine whether prior client relationships between targets and advisors affect a target's choice of banker and announcement return. The results show that target firms are more likely to retain financial advisors when the

relationship is established through previous business, such as stock, bond issuance and M&As. A closer banking relationship would increase the probability of that particular advisor being chosen. Moreover, deal complexity and the prestige of acquirers' advisors also play a role in determining the decision to hire investment bankers for targets.

French et al. (2016) explore the impact of firm-investment banking relationship using a sample of Japanese takeovers during the period 2000 to 2015. The results suggest that firms are motivated to initiate acquisition attempts by relationship banks. The significant increase in M&A activities in the 2000s can be attributed to the information advantage brought by investment banks. Closer bank-firm relationships are associated with a higher probability of acquisition attempt and larger deal volume. However, M&A decisions are negatively affected when investment banks also act as a lender or shareholder within the firm. The findings imply that banks play a major role in corporate governance and control rights.

4.2.4 Social network with financial firms

Recently, the personal network between firms and financial firms, especially director-to-director ties, have attracted considerable interest from academic researchers. Previous literature shows that social network positively affects business activities and performance in two ways: information advantage and enhanced monitoring. Firstly, social connection improves the information flow between firms, reduces information asymmetry and saves on the costs of obtaining information, especially when the cross-firm linkage is much closer and more high quality. Secondly, connected directors may play a monitoring role in investment decisions as directors' responsibility is to maximise shareholders' value. Additionally, strict

monitoring from connected directors could alleviate concerns around agency conflicts. Engelberg et al. (2012) explore the effect of social ties between firms and commercial banks linked through educational background and find that personal connections deliver better financing terms for connected firms, including lower loan interest rates, higher credit ratings and better stock performance due to improvements in terms of information flow and monitoring effectiveness. Uzzi (1999) shows that the cost of capital is reduced when firms have social ties with middle-market banking representatives.

Furthermore, social connection significantly affects investment decisions and provides channels for connected firms to acknowledge the real value and information of connected firms. Cohen et al. (2008) indicate that managers of mutual funds are more likely to place higher portfolio weight in firms with a social connection. Strikingly, investments in connected partners deliver higher returns than holdings in companies without social ties. Hochberg et al. (2007) document that venture capital firms with better networks have better access to public and private information, leading to higher return and more profit. Cooney et al. (2015) find that underwriting firms are more likely to invite investment banks who are socially linked through personal networks for IPO equity issuance. Moreover, hiring connected underwriters is a “win-win” choice. The results show that the shareholders of pre-IPO firms have net wealth gain while connected investment banks are compensated by high underwriting fees, senior roles and better share allocation in IPOs. Chen et al. (2014) investigate the interpersonal relationship between customers and suppliers and provide further evidence that firms take social connections into account in the supplier-selection process.

4.2.5 Choice of advisors

Most M&A studies investigate how acquisition partners (bidders/targets) select investment bankers by addressing bank reputation. Bowers and Miller (1990) study advisor choice and shareholders' wealth effect on both bidders and targets. In this paper, financial advisors are classified as first-tier and second-tier based on the prestige of advisors. The results indicate that first-tier bankers could identify acquisition candidates efficiently for bidders or targets, therefore leading to better deals and higher combined abnormal return and holding-period return. Golubov et al. (2012) provide new evidence on the positive relationship between bank reputation and bidders' acquisition performance. Bidders could benefit from employing top-tier investment banks in public transactions by earning higher announcement return and a larger share of synergies. This better deal performance and shorter time to complete transactions can be explained by the fact that top-tier advisors possess a better ability to identify target and negotiation strategies. However, Hunter and Jagtiani (2003) fail to find a positive impact of financial advisor reputation on bidders' acquisition performance. Tier-1 investment banks cannot deliver a high announcement return for bidding firms but are associated with a high probability of deal completion and less time required completing takeover transactions. Ismail (2010) also finds no positive effect of top-tier investment banks on bidders' gain while targets could earn higher wealth gain when top-tier advisors are involved.

Different from the M&A literature on advisor reputation, Kale, Kini, and Ryan (2003) use a measurement of the relative reputation of acquirers' advisor to targets' investment bank by considering the bargaining strategy used in the negotiation process. Bidders with relatively prestigious advisors achieve larger shareholder

wealth gain, a higher proportion of synergies and revoke value-destructive acquisition attempts. Rau (2000) employs market share as a proxy of advisor reputation and re-examines the impact of investment bank market share on contingent fee structure and bidders' acquisition performance. Investment bankers are split into first-tier, second-tier, and third-tier banks by market share. The results reveal that investment bank market share is positively affected by the number of previous deals completed and does not depend on acquirers' post-acquisition performance in the past. First-tier investment banks charge higher contingent fees, leading to a higher probability that deals will succeed but no better announcement return for the bidding firms. The evidence supports the deal-completion hypothesis that investment banks are hired to complete acquisitions.

A few kinds of literature also adopt different classifications of investment banks and investigate their effect on advisor-selection. Sibilkov and McConnell (2014) study the choice of investment bankers by examining the previous acquisition performance of advisors' clients. The findings indicate that acquirers are more likely to choose investment bankers whose former clients show higher cumulative abnormal returns during takeover announcement. Moreover, the probability of retaining previous advisors is positively and significantly associated with clients' prior takeover performance. Furthermore, higher client announcement return would increase market value of advisors in the investment banking market.

C. Wang and Xie (2011) focus on cross-border acquisitions with US bidders and examine the choice between local and foreign advisors. The results show that local advisors are more likely to be hired in deals with greater information asymmetry existing between acquirers and targets. Moreover, bidders are more likely to employ

foreign financial advisors in deals with relatively larger transaction value. The findings could be explained by the fact that local advisors have an information advantage in the larger social network and lower cost to obtain targets' information and target's true value while foreign bankers could provide acquiring firms with professional experience, knowledge, and expertise. Moreover, acquirers benefit from local advisors by earning higher announcement returns in deals with greater information asymmetry and uncertainties. In addition, acquiring firms are less likely to adopt stock as the medium of exchange in deals where local advisors are hired. X. Chang, Shekhar, Tam, and Yao (2016) revisit the issue by considering the industry expertise of investment banks, as measured by the percentage of takeover deals involved in the same industry as the acquirers' or targets' industry in the past five years. Concerned with information leakage, acquirers avoid hiring investment banks which advise their rivals in the same industry. Acquisition partners tend to choose financial advisors who have takeover experience in their own industry due to information advantage. Advisors with industry expertise do charge higher advisory payment fees and complete deals in shorter times but fail to improve merger outcomes, including the announcement return of bidders and targets, the premium paid and the post-acquisition return of bidders.

Francis et al. (2014) investigate acquirers' M&A decisions on advisor and its impact on acquisition performance, as measured by acquirers' announcement return. The author only considers firm-advisor relationships formed in previous equity issuance and takeover activities. The evidence suggests that banking relationships have a finite impact on the choice of M&A advisors and are affected by acquirers' previous takeover experience. Acquirers are more likely to hire their underwriter for previous equity issuance as the investment bank for their first takeover bid. A higher

probability of holding up equity-issuing underwriters is positively associated with stronger advisor relationships and more optimistic analyst recommendations for underwriters. Additionally, acquirers earn significantly lower announcement returns when retaining equity advisors than when employing a new investment bank, especially in acquisitions paid with stock. For acquirers with takeover experience, bidders are more likely to retain previous M&A advisors who delivered a good announcement return in preceding M&A deals, and are therefore more likely to achieve better acquisition performance.

4.3 Hypotheses

In this section, this chapter develops hypotheses on the basis of social network theory and the difference between full-service advisors and boutique investment banks. Overall, this study constructs "friend in business", "agency conflicts" and "boutique skill" hypotheses.

4.3.1 Friends in business

Boutique investment banks, especially domestic boutique advisors, are generally small and not known by most of their potential client firms. In the investment banking industry, thousands of competitors deliver similar financial services, are all subject to endogenous entry, and all face both price and non-price competition (Anand & Galetovic, 2006). Therefore, from the standpoint of banks, investment banks are motivated to establish and maintain long-run relationships with corporations to obtain business in the future. In particular, it is difficult for domestic boutique banks, mostly relatively unknown banks, to attract clients solely through their reputation and popularity. Moreover, large investment banks, and generally

full-service banks, can more easily afford large marketing and relationship-building costs than small ones. Therefore, social connection through directors' personal networks plays an important role in pursuing business, especially M&A business, which contributes a large amount of advisory fees to banks' profit. Boutique banks rely more on social network than full-service banks. Moreover, the majority of overlapping directors (those who concurrently work at an acquiring firm and its investment bank) serve as independent directors in full-service banks, which may negatively affect full-service banks to get business from connected firms.

From the standpoint of clients, bidding firms are willing to select investment banks that are closely linked as their financial advisors. Building on the social network literature, social ties boost the exchange of financial and non-financial resources, improve interactions between socially connected firms, and facilitate transactions which may otherwise be difficult or even impossible to complete. Connected firms can also capture information advantage at a lower transactions cost (Ingram & Zou, 2008). Mol (2001) shows that well-connected firms have better access to information on other firms' experience, and therefore could learn from those firms and increase firm value by avoiding mistakes. Schonlau and Singh (2009) propose that firms with social ties can enjoy high-quality information but save on the costs of acquiring it. Moreover, the previous literature confirm that firms are more likely to choose "friends" as business partners. Cooney et al. (2015) find that underwriting firms are more likely to invite investment banks who are socially linked through personal networks for IPO equity issuance. Moreover, hiring connected underwriters is a "win-win" choice. Chen et al. (2014) investigate the inter-personal relationship between customers and suppliers and provide further evidence that firms take social connections into account in the supplier-selection process. Therefore, this chapter

established the following hypothesis:

H1: Acquirers are more likely to employ closely connected boutique investment banks as M&A advisors, especially domestic boutique investment banks.

4.3.2 Agency conflict hypothesis

Another feature of boutique investment banks is their independence. Song et al. (2013) cite the description of global boutique advisor Lazard and document that boutique investment banks may be free of some agency conflicts due to having fewer business lines than full-service banks. Kosnik and Shapiro (1997) provide another explanation for agency problems between firms and investment banks and also support that boutique investment banks are related to fewer agency conflicts. The authors indicate that firm-banking agency conflicts are caused by information asymmetry between acquisition partners and investment banks, as well as the duration of the relationship. Larger information asymmetry and a shorter-duration of relationship leads to agency problems even worse. Full-service investment banks have far greater advantages over acquiring firms in terms of information, experience, network, and expertise. Therefore, full-service banks have more power to identify target candidates and negotiate, therefore leading to more agency conflicts than boutique banks. Due to their large network, full-service banks may know both the target and acquiring firms in deals. In this case, full-service banks may consider the interests of both acquirers and targets even if they are the M&A advisors to the acquirer.

Regarding the causes of agency problems, Kosnik and Shapiro (1997) indicate that agency problems could be improved by reducing information asymmetry and

strengthening the firm-banking relationship beyond single transactions. Previous studies on social network confirm that the existence of social connections facilitates information exchange and save the time and costs involved with obtaining information, therefore significantly reducing information asymmetry. Moreover, social connections through personal linkages are built beyond single deals and are long-lasting. Therefore, social connections with boutique advisors would further reduce agency conflicts between firms and investment banks. Moreover, connected boutique banks have a stronger incentive to maintain the "friendship" for future business, therefore maximising the interest of acquiring firms. However, the effect of social connection may be negative in full-service deals. Boot (2000) summarises the previous literature on relationship banking and point out that banking relationships raise "locked-in" problems. A "locked-in" single firm-banking relationship may lead to worse deal terms (such as higher advisory/underwriting fees, or higher loan interest) attributed to the bank's information monopoly. Information monopoly is more likely to occur in connected full-service deals as the imbalance in information and negotiation power is more severe in full-service deals. Moreover, acquiring firms hiring full-service banks are generally larger in size and involved in larger takeover deals. Large bidding firms may first consider large connected banks to save time and cost in finding and negotiating with M&A advisors. Therefore, bidding firms connected with full-service banks may face information monopoly and miss opportunities to hire better ones who deliver more favourable M&A services. Furthermore, investment banks may initiate acquisition attempts and persuade acquirers to take over targets. Due to familiarity bias, connected bidding firms would be the preferred potential candidates for full-service banks. In this case, investment banks would place the interests of combined entities over the interest of connected

acquirers.

Boutique advisors generally specialise in M&A advisory business or services in certain industries (such as technology, healthcare or media) while full-service banks provide full-line financial services, including equity issuance, debt issuance, M&A advisory and trading. Therefore, full-service banks which are socially connected with acquirers may also have relationships with target firms through previous business. According to Fernando, May, and Megginson (2012), firm-banking relationships built via equity and debt issuance are more valuable to investment banks than relationships generated in M&A, since the information obtained in the M&A transactions may lose value after takeover deals are completed. Therefore, connected full-service banks may act against the interest of bidding firms. The issue of multiple firm-banking relations is less likely to occur in deals with boutique advisors, which would therefore value the existing network and serve the interests of bidding firms.

Overall, boutique banks linked with acquirers tend to serve the interest of bidding firms and negotiate better terms such as acquisition premiums while connected full-service banks may act against the bidders' interests. Therefore, this chapter fomulates the following hypotheses:

H2.1: Acquirers pay lower acquisition premium when bidding firms have a first-degree connection with boutique advisors than acquirers without connection.

H2.2: Acquirers connected with full-service banks pay higher acquisition premium than acquirers with no connection.

Previous studies on M&A indicate that acquisition premium positively affects target announcement return. On the basis of hypothesis 2 and hypothesis 3, first-degree

connection with boutique advisors may decrease target announcement return while the close connection with full-service banks may increase target announcement return. Therefore, this chapter develops the following hypotheses:

H3.1: Boutique advisors with first-degree connection are associated with lower target announcement return than those with no connection.

H3.2: Full-service advisors with first-degree connection are associated with higher target announcement return than those with no connection.

Moreover, boutique investment banks specialise in M&A advisory services and certain industries while full-service businesses may be distracted in terms of their attention and effort. Therefore boutique banks may provide better takeover services to acquisition partners. Song et al. (2013) provide empirical evidence and support that boutique M&A advisors deliver favourable deal outcomes. Combining with the "agency conflict hypothesis", connected boutique advisors act in acquirers' interests, identify better targets and negotiate better deal terms, resulting in more valuable and profitable transactions for acquiring firms. Therefore, acquirers with connected boutique advisors outperform non-connected acquirers in the long term. However, agency conflicts in connected full-service deals decrease long-run post-acquisition performance. First-degree connections are considered to be closer, better-quality relationships between acquiring firms and investment banks. Hence, the existence of first-degree connections with boutique advisors delivers better deal outcomes in the long run. Therefore, this study formulates the following hypotheses:

H4.1: Boutique advisors with first-degree connection are associated with better long-run performance than those with no connection.

H4.2: Full-service advisors with first-degree connection are associated with worse long-run performance than those with no connection.

4.4 Data and sample selection

4.4.1 Sample selection criteria

The analysis requires data from various sources. The study employs a sample of US takeover deals announced between 1st January 2005 and 31st December 2016. The deal information and characteristics are collected from the Thomson One Banker database. Deal status must be either completed or withdrawn. All the acquirers are publicly listed while targets include public and private firms. Deals in regulated industries (such as financial and utility firms) are excluded. The original sample contains 21,911 observations. The study further cleans the sample by removing those deals with a transaction value of less than $1 million, leaving 10,748 observations. Since the research focuses on social connection between acquirers and their M&A advisors, the sample drops in-house deals, which are defined as deals with no advisors employed according to Servaes and Zenner (1996) and M&A deals with no advisors reported in Thomson One, yielding 2,979 observations. In order to fully differentiate the connection effect between full-service advisors and boutique advisors, the study drops those deals with mixed investment banks, in which acquiring firms hire concurrently full-service banks and boutique investment banks. To eliminate the "previous business" bias, the sample also excludes transactions in which acquirers have selected their previous IPO underwriter, debt issuer or M&A advisor and limits the sample to acquisitions advised by newly appointed investment bankers. Finally, the study requires acquirers' stock price information and accounting information to be reported in the CRSP and COMPUSTAT databases, respectively.

The final sample consists of 1,565 takeover deals, including 471 public transactions and 1,094 private ones. Among the full sample, 625 deals (39.94%) are involved with boutique investment banks while 940 deals are advised by full-service advisors. Of the final sample (1,565 deals), there are only two unsuccessful deals, in which both acquisition partners are publicly listed. Additionally, these two incomplete transactions were advised by non-connected full-service banks. Therefore, in this study, all connected deals are successfully completed, regardless of advisor type.

The social connection between acquirers and advisors are manually collected and filtered using the BoardEx database, which provides data on the social network of board members and senior executives. For the identification of social connection, this chapter follows Cai and Sevilir (2012) and defines two types: first-degree connection and second-degree connection. First-degree connection refers to the situation where acquirers and their selected advisory firm shared the same board member when the acquisition was announced. Second-degree connection means that two individual board members, respectively from the bidder and the investment banks, both worked on the board of a third firm during the takeover period. In the full sample, 6.39% of acquisition deals (100 deals) are socially connected by either a first-degree connection (49 deals) or a second-degree connection (51 deals). In the deals advised by boutique banks (625 deals), there are 9.44% deals (59 deals) with social connection. In 30 boutique deals (4.8%), acquirers have a first-degree connection with boutique advisors. However, the percentage of connected transactions is lower in the full-service deal segment, in which 4.37% are socially linked between acquirers and full-service investment banks and 2.02% are first-degree connected.

4.4.2 Boutique investment banks vs. full-service banks

Acquirers' advisors are classified into full service and boutique investment bankers. Consistent with Song et al. (2013), a full-service advisor refers to an investment banker who engage in full-line financial services including trading, underwriting, M&A advisory, security and debt services, etc. Boutique advisors are non-full-service advisors, providing expertise in certain industries (such as technology, healthcare, etc.) or corporate finance (such as mergers and acquisition, restructuring, etc.). Compared with full-service advisors, boutique investment bankers are smaller in size and independent. The types of acquirer advisor are identified by examining the business line description on the official website for each advisor. Furthermore, boutique advisors are divided into global boutique investment banks and domestic boutique investment banks based on the scope of their business. Global boutique advisors are identified if the investment banks provide international services and describe their business scale as being global on their official website while domestic boutique advisors focus on the US and regional markets.

4.4.3 Descriptive statistics

[Insert Table 4.1 About Here]

Table 4.1 presents the summary statistics for the sample of takeover deals from 2005 to 2016 and reports the mean values and standard deviations (or the number and percentage of dummy variables for deal characteristics) for firm characteristics (bidding firms and target firms) and deal characteristics. The descriptive statistics are listed for full samples, deals advised by full-service banks and transactions involving boutique advisors in Panel A, Panel B, and Panel C, respectively. In each panel, the

sample is further split into deals with a social connection and transactions with no connection. Descriptive statistics for deals with first-degree connections are also reported in the table.

In Table 4.1, the market value of the bidding firms is larger in connected deals in the full sample (Panel A) and in acquisitions advised by full-service banks (Panel B). However, no significant difference in terms of acquirer firm size is observed between first-degree connected deals and transactions without connection, indicating that larger bidders are more likely to appoint connected banks as their M&A advisors, especially second-degree-connected banks. Additionally, the difference in transaction value is positive and statistically significant at the 1% level between connected and non-connected deals in all three panels regardless of advisor types. The findings imply that bidding firms tend to hire "friend" advisors in larger deals. Social connection reduces information asymmetry and increases the sense of trust between acquirers and investment bankers. Larger M&A deals are more complicated and therefore require more effort and time to negotiate contract terms. Bidding firms in larger M&A transactions may suffer more agency conflicts, resulting in less favourable deal outcomes. Therefore, bidders are more likely to invite connected banks to be their M&A advisors due to trust, familiarity bias, and better information transfer. In addition, investment banks are willing to advise on connected deals as they have higher transaction value and the bank therefore charges higher advisory fees, which is confirmed in the summary statistics. Moreover, advising connected firms can save M&A advisors a great deal of time and effort in terms of acknowledging client companies, obtaining information and discussing deal terms. Larger deals should take longer for takeover transactions to be completed. However, Table 4.1 does not show that socially connected deals with a larger size take longer

to complete than non-connected transactions.

Furthermore, in Panel B, the target firm can be seen to be larger in size in the connected full-service sample than in the non-connected ones, which is attributed to deal complexity and the advantage of social connection. Panel C shows that the Tobin's Q ratio of target firms is significantly higher in M&A deals advised by connected boutiques.

4.5 Empirical results

To better understand the influence of social connection on advisor-selection, this chapter undertakes multivariate analysis and reports its empirical results in this section. The study first investigates how the choice of M&A advisor is affected by social ties between acquirers and investment bankers and then analyses takeover outcomes when deals are advised by connected and non-connected investment banks. Specifically, this study examines the impact of connection on acquisition premium, advisory fee and announcement return, stock, operating and cash flow performance in the long run.

4.5.1 Advisor selection

This section examines the role of social connection between acquirers and investment bankers in the advisor selection process by using models developed in Bouwman (2011). To fully evaluate the impact of social ties with various types of advisor, the acquisition sample is classified into deals advised by full-service investment bank and boutique advisors. The boutique investment banks are further divided into global boutique banks and domestic boutique advisors based on the scale of their business.

Bouwman (2011) studies the determinants of direct selection and examines whether firms are prone to appointing directors who previously worked in companies with a similar corporate governance structure. Bouwman develops a logit model and includes both selected directors and potential director candidates who were not appointed to examine the familiarity effect in firms' direct-selection process.

Following Bouwman (2011), this chapter employs logit regressions in the advisor-selection process and also includes bank and deal characteristic that could affect acquirers' choice of advisor. In addition, the study excludes deals advised by equity or debt underwriters, and former M&A advisors to ensure that the empirical results are not biased by the previous business linkage between acquirers and investment bankers. Furthermore, this study takes extra care and excludes bidders who initiate multiple acquisition attempts for the same target firm in one year and keep the deals with the earliest announcement date. To improve the accuracy of direct-selection analysis, for each takeover deal, the study not only considers the advisors employed in the acquisition but also includes the 100 most active investment bankers as potential advisors who were likely to have been picked by the acquirers. Following Q. Huang et al. (2014), the top 100 most active advisors are ranked by the number of deals and aggregate transaction value of deals they have advised on over the sample period from 2005 to 2016. The top 100 M&A advisors, including both full-service and boutique banks, engaged in at least 15 M&A deals from 2005 to 2016. To make the list of the top 100 most active investment bankers, this study excludes deals advised by various investment banks and pays closer attention to advisors with multiple names (for example, Morgan Stanley, Morgan Stanley & Co). The issue of the same firm having multiple names is a common problem in the BoardEx database. Therefore, there are more than 100 banks in the

list of choice of M&A advisor. Finally, in advisor selection analysis, each acquirer is matched with 111 potential investment bankers (or 110 if the advisor selected is among the top 100 banks), which leads to 237,807 bidder-advisor pairs.

This study then manually scrutinises the social ties between bidders and the sample of 111 (or 110) investment bankers in the BoardEx database. The first-degree connection is defined as acquirer and advisor firms sharing the same board member or top executives (CEO/CFO/President) during the acquisition period. Second-degree connection refers to two individual board members, respectively from the acquirer and the bank, serving on the same third board during the takeover announcement. Next, the logit (logistic) model is specified to analyse whether an acquirer-advisor pair is selected due to the connection between firms and banks. The logit regression function is defined as follows:

$$\text{prob}(selected\ as\ M\&A\ advisor) = f(social\ connection, X)$$

$$\text{logit}\left(p\left(slected_i^k\right)\right) = \log\left(\frac{p\left(slected_i^k\right)}{1 - p\left(slected_i^k\right)}\right)$$
$$= \beta_0 + \beta_1 * FirstDegreeConnection + \beta_2$$
$$* SecondDegreeConnection + \beta_i * X_i + \tau_i$$

where $p\left(slected_i^k\right)$ is the probability that in the i^{th} deal, bidding firm employs investment banker k as M&A advisor; X_i refers to control variables including bank and deal characteristic; τ_i is year and industry fixed-effects for acquiring firm i

In the logit regression, the dependent variable is the dummy variable, which equals one if advisor k pair is selected in the i^{th} takeover transaction; zero otherwise. The

independent variable is social connection dummy variables, including first-degree connection dummy variable (which equals one when acquirers have first-degree connection with banks; zero otherwise) and second-degree connection dummy variable (which equals one when second-degree connection exists; zero otherwise). The bank and deal characteristics are also included as control variables. Year and industry fixed effects and firm-cluster effects are considered in the regressions. Table 4.2 presents both coefficients and odds ratios to interpret the regression results. The odds ratio in a logit model is a ratio of the probability of success over the probability of failure. In the context of social connection, the odds ratio is defined as the probability of a certain bank being selected as M&A advisor divided by the probability of it not being selected. It ranges from 0 to positive infinity.

[Insert Table 4.2 about here]

Panel A of Table 4.2 reports the full sample where an acquirer appoints a particular investment bank as its advisor. The independent variable is the dummy variable for first-degree connection and second-degree connection between bidders and advisor candidates. The advisor characteristics are controlled in Models 2 and 3 of the advisor-selection analysis, including dummy variables for top-tier, full service and M&A advisory service.

Additionally, the investment bankers are classified by their advisor reputation in accordance with Golubov et al. (2012). The financial advisors rank (top 25) comes from the Thomson One database ranked by the total deal value advised over the period from 2005 to 2016. The top 8 advisors are defined as the top tier, all of which are full-service investment banks in this study. The dummy variable of top tier advisor equals one if the bank is listed among the top 8 financial advisors; zero

otherwise. The full-service advisor dummy variable has a value of one if the investment bank provides full-line financial services. The M&A advisory dummy equals one if the investment bank emphasises M&A advisory service in his official web (usually boutique advisor). The coefficient for second-degree connection is significant and negative, indicating that acquirers are less likely to employ advisors who are linked by a second-degree connection. The finding can be explained by the board position of the connected directors, the majority of which serve as independent directors in acquirers' or/and banks' board. Independent directors do not engage in firms' daily business and have less power deciding M&A advisors. Moreover, to avoid potential conflicts of interest and to ensure the independence of outside directors, acquirers' management may not select advisors who are socially linked with them. In Models 2 and 3 with the year and industry fixed-effects, the explanatory variables for investment bank characteristics show a strong and positive relationship with acquirers' choice of M&A advisor. Bidding firms are prone to appointing top-tier investment banks as M&A advisors. Full-service investment banks are more likely to be selected by acquiring firms. Additionally, bidders are highly likely to consider M&A advisory experts when initiating acquisition attempts.

Next, the chapter examines the effect of social connection on acquirers' decision to hire full-service investment banks in Panel B. The dependent variable is a dummy variable which equals one if a paricular investment bank is hired as M&A advisor with the subsample of full-service advisor candidates. Both first-degree connection and second-degree connection take a negative sign and are statistically significant at the 1% level. The findings indicate that social connection generates negative impacts on advisors' decision. Güner, Malmendier, and Tate (2008) find that acquirers' board directors who concurrently sit on the board of the M&A advisor would favour their

own investment banks and act against the interests of the acquirers' shareholders, therefore negatively affecting acquisition performance. Therefore, acquiring firms avoid employing socially linked full-service advisors due to conflicts of interest. The takeover deal characteristics are controlled in Models 2 and 3, which may affect the advisor-selection process. Moreover, both the year and industry fixed effects are included in Model 3. The coefficient of deal size is positive and significant, suggesting that acquirers are more likely to choose full-service banks in deals of a larger transaction value. In addition, tender offers increase the likelihood of a full-service advisor been selected. Our findings support the scale hypothesis in Song et al. (2013) that acquiring firms take into account the deal size when choosing M&A advisors and that full-service investment banks are more likely to be chosen in takeover deals of a larger size.

Panel C of Table 4.2 analyses how social ties with boutique investment banks influence acquirer-advisor selection. The dummy dependent variable equals one if particular boutique banks are selected to advise takeover deals from the subsample of boutique advisor candidates. Similar to the findings in Panel A and Panel B, second-degree connection remains negative and significant at the 1% level. However, the first-degree connection is positively associated with advisors' choice, suggesting that acquirers are more likely to pick boutique banks who share a board director.

Furthermore, boutique advisors are classified as global boutique advisors and domestic boutique banks according to the business scope. The results in Panel D and Panel E show that first-degree connections between domestic boutique advisors and acquirers highly and significantly increase the probability of banks being appointed. The odds ratio of first-degree connection is as high as 4.27 with deal characteristics

and fixed-effects controlled. This indicates that with first-degree connections, the probability of boutique investment banks being selected is four times the probability of not being picked in the subsample of domestic boutique advisor. This finding is consistent with Hypothesis 1. According to Anand and Galetovic (2006), the investment banking market is highly competitive. Most bank competitors provide similar financial services to clients. M&A advisory service contributes a great share to banks' profit. In general, top-ranked advisors, usually full-service banks, occupy the majority of market share of takeover services. Compared with boutique banks, full-service advisors have a sizeable advantage in terms of information, experience and external resources. Their valuable resources and reputation attract potential clients who proactively choose full-service banks as financial advisors. After the 2007 financial crisis, elite boutique banks, which deliver global financial services, started to grab M&A market share from the "bulge bracket" full-service banks. However, the competition for smaller boutique banks that focus on US and regional markets is still fierce. Therefore, domestic boutique advisors have a strong incentive to establish social connections with firms for business. Firms are willing to select connected banks as their advisors due to the information advantage and familiarity effects in social connection as well as similar services provided in the advisory market. Our findings in Panel E provide empirical evidence that first-degree connections help domestic boutique advisors to "win" M&A advisory service and bidding firms are willing to select closely connected banks.

Advisor and takeover deal characteristics are controlled in Model 2 of Panel D, and Panel E. Model 3 includes the additional year and industry fixed effects. The acquirer-clustering effect is considered in all models. Smaller deal size and hostile deal type increase the likelihood of an acquirer hiring a boutique bank, including

both global and domestic boutique investment banks, as their M&A advisor. Moreover, bidding firms are more likely to consider a global boutique advisor in private transactions while a toehold deal type reduces the probability of a global boutique bank being appointed. Consistent with Song et al. (2013), boutique advisors are more likely to be involved in smaller-sized deals and complex transactions due to their skill and independence. Hostile, tender offer and non-toehold deals increase the difficulty and complexity of takeover transactions. Compared with domestic boutique advisors, global boutique investment banks have more advantage in terms of their expertise and independence and are therefore more likely to be appointed in complicated takeover deals, including hostile, tender offer, non-toehold, and private acquisitions.

4.5.2 Acquisition premium

Acquisition premium reflects the negotiation power between acquirers and targets and has a substantial impact on post-acquisition performance. Advisors connected with bidders, especially domestic boutique advisors, have a strong incentive to negotiate a low acquisition premium in order to maintain a long-run relationship and gain future business. This section classifies the acquisition sample by types of advisors and examines the relationship between a social connection and takeover premium. Since the private deals account for 68.69% of the full sample, the acquisition premium is calculated for both public deals and private transactions to improve data availability. Public acquisitions refer to transactions in which acquirers and targets are publicly listed while private acquisitions are deals in which public acquirers take over private target firms. The offer premium in public deals is measured as the log percentage difference between offer price (from Thomson One)

and target stock price four weeks before the takeover announcement (from CRSP). For private acquisitions, the premium is obtained by constructing a comparable portfolio with public transactions and calculating an acquisition discount for each private deal (Officer, 2007). According to Officer (2007), acquisition discounts are due to illiquidity in selling private targets. Private targets are not able to sell their firms quickly and easily, unlike public firms. Therefore, private target firms would accept a discount in terms of acquisition premium relative to comparable public firms.

Following the procedures in Officer (2007), this study first constructs a comparable portfolio with public transactions for each private takeover deal. The targets in the corresponding public deals are required to operate in the same industry as the private targets. That is, private targets must have the same two-digit SIC code as the public targets in the comparable portfolio. The deal value excluding liabilities assumed (from Thomson One) for comparable transactions is allowed to range from 80% to 120% of that of the private acquisitions. Furthermore, the corresponding sample is required to announce over the period from one-and-half-years before to one-and-half-years after the takeover announcement of private deals. The discount in the acquisition premium is calculated as the percentage difference between the acquisition multiple of the private target and an average multiple of the public deals in the comparable portfolio. Consistent with Officer (2007), four types of acquisition multiple are adopted, including the ratio of the transaction value to EBITDA, transaction value to sales, P/E ratio and price to book value of equity. Finally, the premium for target transactions is measured as the product of the corresponding average premium of the portfolio and one plus the acquisition discount $(1 + acquisition\ discount)$.

[Insert Table 4.3 about here]

Table 4.3 reports the multivariate regressions for premium analysis. Panel A analyses the effect of social connection using the sample of public and private acquisitions while Panel B shows results for only public deals. The firm-clustering effects are considered in all models. Deal characteristics are controlled in Model 2 and Model 3. The additional year and industry fixed-effects are included in Model 3. The dependent variables in Table 4.3 are the logarithm of an acquisition premium. In deals advised by full-service banks, both first-degree connection and second-degree connection are positively associated with premium. However, a first-degree connection with a boutique advisor, especially a domestic boutique advisor, significantly reduces the acquisition premium paid by acquirers.

In the deals where acquirers and full-service banks have a first-degree connection, all the overlapping directors are appointed as independent directors in the full-service investment banks. 90.20% (46/51) of connected directors hold independent directorships in full-service investment banks. Independent directors mainly play a monitoring role in the corporate governance and financial disclosure. According to (Subrahmanyam et al., 1997), independent directors in banks generally lack professional knowledge and expertise in investment banking services due to the regulation of antitrust and banking laws. Therefore, connection with independent directors in full-service banks does not bring large information advantage to bidding firms.

More importantly, full-service banks are more likely to form and maintain firm-banking relationships and therefore could establish wider networks. A possible explanation is that full-service investment banks provide a full-range business while

boutique banks generally offer single or a few service lines. Chapter 4 shows that in 75% of full-service connected deals, acquirers' advisors had also built client relationships with target firms through previous equity and debt issuance. According to Fernando, May, and Megginson (2012), firm-banking relationships built via equity and debt issuance are more valuable to investment banks than relationships generated in M&A, since the information obtained in the M&A transactions may lose value after takeover deals are completed. In addition, first-degree connections between acquirers and advisors are established via personal network, mainly the network of independent directors. For full-service investment banks, relationships with targets are more valuable than connections with acquirers. Moreover, acquirers which hire connected full-service banks are more likely to face information monopoly and "locked-in" problems, resulting in more agency problems between acquirers and connected full-service advisors (Boot, 2000). Therefore, full-service investment banks would act against the interest of connected acquirers and negotiate higher acquisition premiums.

In contrast, in connected boutique deals, 83.05% (49/59) of connected directors serve as executives in banks and bidders. Connections with top management could bring larger information advantage and mitigate the information asymmetry between acquirers and boutique advisors, resulting in fewer agency problems (Kosnik and Shapiro, 1997). Additionally, the issue of multiple firm-banking relations[29] is less likely to occur in deals advised by boutique investment banks, since boutique advisors are more independent and have fewer business lines. Moreover, connected boutique advisors have more incentive to take more effort to negotiate a lower

[29] Here, the multiple firm-banking relationships refer to the situation where the acquirers' advisors also have relation with target firms.

takeover premium and act in acquirers' interests to maintain the firm-bank relationship. In all, the results indicate that social ties with a full-service advisor may lead to conflicts of interest while acquirers benefit from a connection with boutique banks by paying a lower premium.

Moreover, in the subsample of deals with full-service banks, using cash as the payment method significantly reduces the acquisition premium (Moeller et al., 2004). Tender offers are positively related to premium (Bargeron et al., 2008; Moeller et al., 2004; Officer, 2003). By excluding private acquisitions, similar findings are shown in Panel B that in public deals, acquisition premium is negatively associated with social connection with boutique banks and positively related to ties with full-service banks.

4.5.3 Announcement return

[Insert Table 4.4 about here]

The study next addresses the valuation effect of social connection in the short run by analysing the announcement return of acquirers, targets, and combined firms. Short-run performance is measured using cumulative abnormal returns (CAR) with a five-day event window centred on the announcement day. Consistent with Brown and Warner (1985), the five-day CAR is calculated using the market model. The estimation period for parameters in the market model starts 200 trading days before the announcement date and ends 20 trading days before. This study then computes the daily abnormal return with the parameters and stock information from the CRSP database. Five-day CAR is finally obtained by summing up the daily returns over the event period (from 2 days before to 2 days after the takeover announcement). To

gauge the market reaction to connected and non-connected deals, we examine the five-day CAR of acquirers (ACAR(-2, +2)), targets (TCAR(-2, +2)) and combined firms (CCAR(-2, +2)). The five-day CAR of the combined entity is the value-weighted average of the five-day CAR of the bidding firms and the CAR of target firms. Since stock information is only available for publicly listed firms, TCAR(-2, +2) and CCAR(-2, +2) are missing in the sample of private acquisitions. Table 4.4 reports regression results estimated with the ordinary least square (OLS) method. All models control the firm, deal characteristics and acquirers-clustering effects. In Model 2, year and industry fixed effects are included.

In Panel A of Table 4.4, the dependent variable is acquirer announcement return with a five-day event window. The coefficient of first-degree connection is insignificant regardless of which type of advisor is hired. The study further examines the relationship between social connection and acquirer announcement return in public deals and private transactions. And the un-tabulated results find similar results of acquirers' short-run performance not being affected by social connection between bidding firms and investment banks. The possible explanation could be that the market does not recognise the acquirers' connection with M&A advisors since the firm-banking linkage is formed via individual network. In addition, acquirers who hire connected full-service advisors are more likely to face information monopoly and "locked-in" problems, leading to larger agency problems between acquirers and targets.

Panel B presents the multivariate analysis for target announcement return proxy by cumulative abnormal return with a five-day event window of target firms. In the sample of deals advised by full-service banks, first-degree connection exhibits a

strong (significant at 5% level) and positive relationship with Target CAR(-2, +2), consistent with the high acquisition premium received by target firms. In contrast, the coefficient of a first-degree connection takes a negative sign and is statistically significant at 5% when boutique banks are chosen. A possible explanation could be that 75% of connected full-service banks also know target firms via previous financial services. Moreover, the firm-banking relationship built via previous equity or debt issuance is more valuable as it could bring more knowledge and future business to investment banks (Fernando et al., 2012). Therefore, full-service investment banks would act against the interest of acquirers, negotiate lower premiums and deliver higher announcement return for target firms. In contrast, boutique banks are less likely to have a wide network via various business lines; connected boutique banks rely more on the social network and would better act in the interest of acquirers and negotiate a lower premium when bidding firms share the same board director with the banks (first-degree connection). The market reacts negatively to low takeover premiums, which is reflected in a lower announcement return of the target firms.

Panel C shows the analysis of the abnormal return of combined firms. The average value-weighted CARs are positively and significantly (at 5% with fixed-effects controlled) associated with the first-degree connection when acquirers hire full-service banks in takeover transactions. In the subsample of boutique banks selected as advisors, however, no strong relationship is observed between social ties and the stock performance of combined firms. The findings indicate that connected full-service investment banks which also know target firms would place the interests of the combined entities over the interest of connected acquirers.

Consistent with the prior literature, in the full sample, an increase in acquirers' leverage, deals with a hostile attitude and payment with cash (Travlos, 1987) improve acquirers' announcement performance while a diversification deal (Morck, Shleifer, & Vishny, 1990) reduces the acquirer's announcement return. In addition, the announcement returns of target firms are positively related to the acquirers' Tobin's q (Dong et al., 2006), cash as the method of payment (Y.-S. Huang & Walkling, 1987) and transactions in which acquirers and targets do not operate in the same industry. Regarding combined announcement return, acquisitions paid with cash have a higher return during the announcement period. The sign and significance of the coefficients in the subsample of full-service advisors are similar to the coefficients of the explanatory variables in the full sample. When boutique advisors are hired, the results show that acquisition with cash used as the payment medium exhibit higher acquirers' return during the announcement period (Travlos, 1987). Acquirers' Tobin's q and targets Tobin's q (Dong et al., 2006) have positive effects on target announcement return while acquirer leverage shows a negative relation.

4.5.4 Long-run post-acquisition performance

Finally, this chapter re-examines the effect of social connection between acquirers and investment bankers by studying post-acquisition performance in the long run. To be specific, long-run performance is evaluated using buy-and-hold return as a proxy for stock performance, industry-adjusted return on assets as a measurement for operating performance and cash flow performance. According to the previous findings, full-service advisors with a social connection give priority to deal completion and sacrifice acquirers' shareholder interest while connected boutique banks negotiate better takeover terms for acquirers in order to maintain firm-bank

relationship. Acquirers could benefit from a social linkage with boutique advisors and achieve more valuable and profitable acquisitions. Therefore, bidding firms are expected to earn better long-run return and performance in deals advised by connected boutique advisors. This study undertakes multivariate analysis estimated by the ordinary least square (OLS) method and considers acquirer-clustering effects in all regressions. Additionally, firm and deal characteristics are included as explanatory variables with the year and industry fixed effects controlled.

4.5.4.1 Buy-and-Hold Return (BHAR)

In this subsection, long-term stock performance is measured using buy-and-hold abnormal return (BHAR). BHAR is computed as the difference between the buy-and-hold return of acquirers and buy-and-hold return of reference portfolios. Following Bouwman et al. (2007), this study identifies 50 reference portfolios for acquiring firms, classified by market valuation and Tobin's Q ratio. Then, the buy-and-hold return of reference portfolios is calculated by compounding the average return of each portfolio for the event period. Finally, the size-adjusted BHAR is obtained by subtracting the BHAR of the reference portfolio from the BHAR of acquiring firms. This study analyses acquirers' buy-and-hold return for 3-month, 6-month, 9-month, 12-month, 24-month and 36-month periods.

[Insert Table 4.5 about here]

In Table 4.5, Panel A, Panel B and Panel C show acquirers' long-run stock return for the full sample, the sample of deals advised by full-service banks and the sample of boutique banks fired as M&A advisors, respectively. In Panel A, first-degree connection shows a positive and significant (at 10%) relationship with acquirers'

buy-and-hold return for 3 months after takeover announcement. However, the positive relationship does not exist when holding acquirers' stocks for over 3 months in the full sample. In Panel B, the coefficients for first-degree connection in all regressions enter take a negative sign and are statistically significant over the holding period from 3 months to 36 months after the announcement day when acquirers hire full-service investment banks. The longer period over which acquirers' stocks are held, the more negative relationship we find between the acquirers and connected full-service advisors. The results indicate that acquirers suffer a loss in post-acquisition stock performance in the long term when employing full-service investment banks who share the same board member (first-degree connection). These findings are consistent with our expectations, which can be explained by the fact that full-service banks who are closely linked with acquirers are motivated to complete deals since advisory fees are charged based on the completion of transactions.

Panel C of Table 4.5 reports the buy-and-hold return analysis when acquirers select boutique banks as M&A advisors. We observe that first-degree connection with boutique advisors is positively associated with long-run stock return of acquirers. Moreover, first-degree connection significantly increases buy-and-hold return within one-year holding period. The strong and positive relationship remains between acquirers and boutique advisors even with year and industry fixed effects controlled when holding acquirers' stocks for 3 months, 6 months and 9 months after takeover announcement. However, we find no strong relationship if the holding period is longer than 9 months, suggesting that the positive effect of connection on post-acquisition stock performance can only last for less than one year. The results provide evidence that acquirers benefit from closer connection with boutique

advisors and achieve significantly better stock return in the long run.

In addition, buy-and-hold return is reduced in deals with larger transaction value relative to acquirers' firm size, transactions paid with stock method and deals involving multiple bidding firms. Moreover, acquirers with a larger market-to-book value ratio earn less long-run stock return.

4.5.4.2 Industry-adjusted Return on Assets (IAROA)

[Insert Table 4.6 about here]

Next, this chapter investigates the impact of social connection on long-run operating performance. The proxy metric used to study this impact is acquirers' industry-adjusted return on assets (IAROA) for the year after the announcement date. The industry-adjusted ROA is that the acquirers' ROA minus the median ROAs for firms operating in the same industry and with the same first two digits of Standard Industrial Classification (SIC) code as the acquirers. Return on assets (ROA) is obtained using the yearly net income divided by the total assets from the COMPUSTAT database. Due to the availability of the data, this study considers the industry-adjusted ROAs of acquirers for one fiscal year after takeover announcement. Table 4.6 presents multivariate regression analysis with firm and deal characteristics as explanatory variables. In addition, the study controls the firm-clustering effects in all models and includes year and industry fixed effects in Model 2.

In the full sample and the sample with full-service M&A advisors, the effect of first-degree connection is insignificant on acquirers' operating performance in the fiscal year following takeover announcement. However, in the sample of deals advised by boutique banks, the coefficient of first-degree connection is positive and

statistically significant at 5% with additional fixed effects controlled. The findings provide further evidence that socially connected boutique advisors deliver better takeover deals for acquirers in terms of post-acquisition stock return and operating performance while the social connection with full-service banks does not improve acquirers' long-run performance.

Regarding the explanatory variables, acquirers' industry-adjusted ROAs are positively associated with bidders' return on equity pre-acquisition, tender offers and deals using cash as the medium of payment. Toehold deal type reduces the industry-adjusted ROAs.

4.5.4.3 Cash Flow Performance

[Insert Table 4.7 about here]

Furthermore, this chapter analyses cash flow performance as another dimension of takeover outcomes in the long term. Following Gao (2011), this study uses acquirers' operating cash flow gauged by total assets as the measurement of post-acquisition cash flow performance. Due to the availability of the data, this study adopts acquirers' cash flow for the fiscal year just following the takeover announcement from the COMPUSTAT database. Similar to the industry-adjusted ROA, cash flow performance is adjusted by subtracting the median cash flow ratio of sample firms (excluding acquiring firm itself) who are in the same industry and in the same decile of excess cash reserve ratio with acquirers. According to Gao (2011), Healy et al. (1992) and Harford (1999), this study undertakes cash flow analysis by regressing post-acquisition cash flow on pre-takeover cash flow in various samples. Table 4.7 presents cash flow analysis in the full sample (Panel A), the sample of full-service

advisors (Panel B) and the sample of boutique M&A advisors (Panel C). Due to the limited sample size for first-degree connected deals and second-degree connected deals[30], the sample is classified by social connection into subsamples of connected deals and non-connected deals in Table 4.7. The dependent variable is the cash flow ratio of the acquiring firms one fiscal year after the takeover announcement while the independent variable is the cash flow ratio one fiscal year prior to the acquisition. The constant term in the regressions signifies the abnormal cash flow return for acquirers after acquisition transaction.

In Panel A, non-connected deals are negatively and significantly related with post-acquisition cash flow performance while no abnormal cash flow return is observed in the deals with connection. In deals advised by full-service banks (Panel B), acquirers who have a social connection with full-service banks earn -1.44% abnormal cash flow returns on average in the fiscal year post-acquisition. Non-connected deals with full-service banks are negatively related to post-acquisition cash flow performance. However, in Panel C, social connection between boutique advisors and bidding firms increases the abnormal operating cash flow performance by an average of 1.25%. Additionally, acquirers in non-connected deals gain 0.26% abnormal return on average – less than the return earned by bidding firms in connected boutique deals. The findings suggest that acquirers could benefit from social connection with boutique advisors and achieve better post-acquisition cash flow performance while connection with full-service advisors

[30] In the full sample, there are 41 deals with first-degree connection and 59 deals with second-degree connection. In the sample with full-service advisors, 19 deals are connected with first-degree connection, and 22 deals are connected with second-degree connection. In the sample with boutique advisors, there are 30 deals with first-degree connection and 29 deals with second-degree connection. Small sample size may lead to a small degree of freedom, resulting in inaccurate regression results. Therefore, in cash flow analysis, sample is only divided into connected and non-connected deals.

reduces cash flow return. Cash flow analysis further supports the agency conflict hypothesis that connected boutique advisors would serve in the interest of acquirers while full-service banks with social connection may act against acquirers' interest.

4.6 Conclusion

This chapter emphasises the social connection between acquirers and investment banks and examines the role of social connection in deals advised by full-service banks or deals involving boutique investment banks. Specifically, this chapter investigates the connection effect in acquirers' advisor-selection decisions, acquisition premium, takeover announcement return and long-run post-acquisition performance. The empirical results show the different or even opposite impact of social connection in takeover outcomes, which is attributed to the essential difference between full-service investment banks and boutique advisors. Full-service banks deliver full-spectrum financial services, including trading, security issuance, M&A advisory, etc. In contrast, boutique advisors concentrate on M&A advisory services or specialise in particular industries, such as healthcare, technology or media, etc. Generally, boutique advisors are small, infamous and independent investment banks while full-service ones are bulge-bracket, prestigious banks.

Combining the social network theory and the investment bank characteristics, the findings show that boutique banks rely more on social connection to pursue M&A advisory serveries. Moreover, boutique banks, especially domestic boutique advisors, negotiate better deal terms and deliver more favourable takeover outcomes to closely connected bidding firms. Specifically, the existence of first-degree connection (board interlock) significantly increases the likelihood that bidders employ connected boutique advisors, particularly domestic boutique banks. However, acquirers are less

likely to hire boutique banks with second-degree connection due to independent director positions. Moreover, acquirers who share an overlapping director with their boutique advisor (first-degree connection) pay significantly lower acquisition premiums to target firms, therefore resulting in lower target announcement return. No strong relationship is observed between social connection and acquirers' announcement return in boutique deals, implying that the market may not recognise the firm-banking relationship and therefore does not reflect it in terms of stock price movement. In the long run, acquiring firms who have a closer relationship with boutique advisors outperform those bidders without a banking connection in terms of their stock performance and operating performance for the year following the takeover announcement.

However, social connection with full-service banks generates a negative influence for acquirers. This study shows that bidding firms are less likely to hire connected full-service advisors, which can be explained by independent director positions and concerns of potential agency conflicts. The empirical findings in deals with full-service banks confirm the existence of agency problems between acquiring firms and connected full-service banks. Acquirers who are socially linked with full-service advisors pay a higher takeover premium. Similarly, this study finds no significant difference in terms of acquirer announcement return between connected full-service deals and non-connected ones. However, social connection with full-service advisors significantly improves the announcement return for targets and combined entities, implying that connected full-service banks may prioritise the interests of the combined firm rather than those of the bidders. The results could be interpreted that full-service investment banks have large and wide social networks with a large amount of potential client firms and they know both acquirers and targets. Therefore,

even as the advisors of bidding firms, full-service banks may not serve exclusively in the interests of bidders. Furthermore, social connection is negatively associated with long-run performance, measured by buy-and-hold return and industry-adjusted return on assets. However, connection with full-service banks enhances the cash flow performance in the year following acquisition.

In a nutshell, acquiring firms benefit from social connection with boutique banks, especially domestic boutique advisors, and achieve better deals. Closely connected boutique banks serve in the interests of the bidding firms and negotiate more favourable deal terms for acquirers. However, full-service banks with social connections act against the interest of bidder clients and do not improve the deal quality for acquirers.

Table 4.1 – Descriptive statistics

Table 4.1 reports the descriptive statistics for our takeover sample from 2005 to 2016. The study first presents the summary statistics for the full sample in Panel A. Then the full sample is split into deals with full-advisors (Panel B) and deals with boutique advisors (Panel C). In each panel, the sample is classified by social connection between acquirers and their M&A advisors. Social connection refers to the social network through personal linkage of board directors, including first-degree connection and second-degree connection. First-degree connection (so called board interlock) is defined when bidding firms and investment banks share the same board members during the acquisition period while second-degree connection refers to the situation where two individual board members, respectively from bidders and banks, serve on the same board of a third firm during the acquisition period. The mean and SD standard deviation (or number of observations and percentage for dummy variables) is reported for acquisition partners and deal characteristics. The definition of variables is listed in Appendix A. ***, ** and * represent statistical significance at the 1%-, 5%- and 10%-level, respectively.

Panel A full sample

Variables	Full sample (I)		Connected deals (II)		1st-degree Connected (III)		Non-connected deals (Ⅳ)		Connected – Non-connected	1st-degree – Non-connected
	Mean	SD (or %)	Mean	SD (or %)	Mean	SD (or %)	Mean	SD (or %)	(II) - (Ⅳ)	(III) - (Ⅳ)
Panel A: Acquirer related										
Tobin's Q	3.5465	8.7649	2.8265	4.7093	3.8635	4.2563	3.5767	8.8939	-0.7502	0.2868
Market Value	10929	30098	20448	51149	15410	51382	10593	29046	9855.000***	4817.0000
Leverage	0.2082	0.2248	0.2142	0.2092	0.2029	0.1823	0.2080	0.2254	0.0062	-0.0051
Return on Equity (ROE)	0.08881	0.9777	0.0154	0.4463	-0.0450	0.6474	0.0919	0.9936	-0.0764	-0.1369
Panel B: Target related										
Tobin's Q	2.8313	8.2405	6.1532	21.603	-0.4238	8.9650	2.7112	7.3388	3.4420*	-3.1350
Market Value	4577.5	18934	12315	15718	9112.5	13731	4371.4	18983	7943.6000	4741.1000
Leverage	0.1947	0.2667	0.2136	0.1786	0.1696	0.1287	0.1940	0.2695	0.0196	-0.0244
Return on Equity (ROE)	0.0032	2.3062	-0.0083	0.3051	0.1071	0.1078	0.0036	2.3481	-0.0119	0.1035
Panel C: Deal related										
Transaction value ($millions)	1333.0	5702.4	5098.0	17430	2692.8	7550.0	1184.5	4623.5	3913.5000***	1508.3000
Relative deal size	0.4442	1.1433	0.4600	0.8275	0.4008	0.5477	0.4436	1.1530	0.0164	-0.0428
Premium (%)	0.2157	5.4301	0.6807	1.8982	0.3793	0.2625	0.1992	5.5137	0.4815	0.1801

Hostile takeover	6	0.38%	3	3.00%	3	6.12%	3	0.20%		
Tender offer	184	11.76%	6	6.00%	2	4.08%	178	12.15%		
Competing bid	28	1.79%	5	5.00%	3	6.12%	23	1.57%		
Diversification	768	49.07%	38	38.00%	22	44.90%	730	49.83%		
Toehold	1506	96.23%	54	54.00%	31	63.27%	1452	99.11%		
Pure cash deal	902	57.64%	33	33.00%	17	34.69%	869	59.32%		
Pure stock deal	190	12.14%	9	9.00%	4	8.16%	181	12.35%		
Time to resolution (in days)	78.465	92.433	96.585	115.09	82.263	85.692	77.750	91.385	18.8350*	4.5130
Advisory fee (Total $millions)	9.9623	14.026	38.864	34.915	21.933	27.222	9.0080	11.830	29.8560**	12.9250*
Advisory fee (% Deal value)	1.3104	3.4831	0.4791	0.3022	0.4837	0.3487	1.3378	3.5366	-0.8587	-0.8541
Number of observations	1565		100		49		1465			

Panel B full-service sample

Variables	Full sample (I)		Connected deals (II)		1st-degree Connected (III)		Non-connected deals (Ⅳ)		Connected – Non-connected	1st-degree – Non-connected
	Mean	SD (or %)	Mean	SD (or %)	Mean	SD (or %)	Mean	SD (or %)	(II) - (Ⅳ)	(III) - (Ⅳ)
Panel A: Acquirer related										
Tobin's Q	3.523	9.0628	1.9036	5.3758	3.1972	2.0946	3.573	9.1503	-1.2936	-0.3757
Market Value	13978	32360	32240	61889	29271	73935	13492	31106	2969.2654***	15778.1797
Leverage	0.222	0.2182	0.2702	0.2490	0.2664	0.2081	0.220	0.2171	0.0038	0.0462
Return on Equity (ROE)	0.126	0.8900	-0.01510	0.5982	-0.144	0.8966	0.1303	0.8974	0.1291	-0.2745
Panel B: Target related										
Tobin's Q	2.8672	7.1326	3.2995	2.4967	3.1627	1.6986	2.8579	7.2004	0.1368	0.3048
Market Value	5596	21111	17472	16529	15325	16025	5321	43.884	2147.5201*	10003.5730
Leverage	0.2008	0.2414	0.2047	0.1694	0.1657	0.1310	0.2007	0.2430	0.0390	-0.0350
Return on Equity (ROE)	0.021	1.4133	0.1071	0.1071	0.1490	0.1135	0.0197	1.4295	-0.0419	0.1293
Panel C: Deal related										
Transaction value ($millions)	1787.2	5782.5	5802.2971	10173.559	5535.5	10756	1670.4	5567.4	266.7971***	3,865.1000
Relative deal size	0.4558	1.2400	0.3201	0.3687	0.4160	0.4311	0.4594	1.2548	-0.0959	-0.0434
Premium (%)	0.1600	6.1372	0.4101	0.2877	0.5416	0.2100	0.1539	6.2121	-0.1315	0.3877
Hostile takeover	3	0.32%	2	4.878%	2	10.53%	1	0.11%		

Tender offer	143	15.25%	2	4.878%	1	5.26%	141	15.72%		
Competing bid	22	2.35%	2	4.878%	1	5.26%	20	2.23%		
Diversification	458	48.83%	20	48.780%	9	47.37%	438	48.83%		
Toehold	906	96.59%	23	56.098%	9	47.37%	883	98.44%		
Pure cash deal	619	65.99%	18	43.902%	8	42.11%	601	67.00%		
Pure stock deal	99	10.55%	1	2.439%	1	5.26%	98	10.93%		
Time to resolution (in days)	89.545	97.774	129.16	136.45	109.24	97.866	88.393	96.247	19.9200**	20.8470
Advisory fee (Total $millions)	12.103	13.071	52.500	.	52.500	.	11.836	12.690		40.6640
Advisory fee (% Deal value)	0.8981	2.4587	0.7190	.	0.7190	.	0.8993	2.4669		-0.1803
Number of observations	938		41		19		897			

Panel C boutique sample

Variables	Full sample (I)		Connected deals (II)		1st-degree Connected (III)		Non-connected deals (Ⅳ)		Connected - Unconnected	1st-degree – Non-connected
	Mean	SD (or %)	Mean	SD (or %)	Mean	SD (or %)	Mean	SD (or %)	(II) - (Ⅳ)	(III) - (Ⅳ)
Panel A: Acquirer related										
Tobin's Q	3.5869	8.2415	3.6469	3.9226	4.5298	5.6818	3.5832	8.4350	0.0637	0.9466
Market Value	5337	24489	9061	35575	3281	5522	5144	23805	3916.9669	-1863.0308
Leverage	0.1854	0.2339	0.1629	0.1507	0.1393	0.1303	0.1868	0.2380	-0.0239	-0.0475
Return on Equity (ROE)	0.0260	1.1086	0.0435	0.2410	0.0540	0.2133	0.02490	1.1397	0.0186	0.0291
Panel B: Target related										
Tobin's Q	2.6969	11.511	8.7474	30.203	-4.0103	12.262	2.1232	7.8746	6.6242	-6.1335
Market Value	641.33	1722.9	709.37	509.56	828.91	551.12	638.58	1755.4	70.7900	190.3300
Leverage	0.1717	0.3466	0.2225	0.1952	0.1736	0.1464	0.1669	0.3578	0.0556	0.0067
Return on Equity (ROE)	-0.06730	4.2589	-0.1237	0.3933	0.06519	0.09772	-0.06200	4.4564	-0.0617	0.1272
Panel C: Deal related										
Transaction value ($millions)	584.53	5489.9	1555.90	539.3179	391.50	685.12	361.95	2008.2	1,238.1370	29.5500
Relative deal size	0.4230	0.9411	0.5951	1.0954	0.3875	0.6469	0.4141	0.9326	0.1810	-0.0266
Premium (%)	0.3989	1.6001	0.9963	2.8089	0.1358	0.03812	0.3554	1.4800	0.6409	-0.2196
Hostile takeover	3	0.48%	1	1.69%	1	3.33%	2	0.35%		
Tender offer	41	6.56%	4	6.78%	1	3.33%	37	6.54%		

Competing bid	6	0.96%	3	5.08%	2	6.67%	3	0.53%		
Diversification	310	49.60%	18	30.51%	12	40.00%	292	51.59%		
Toehold	600	96.00%	31	52.54%	13	43.33%	569	100.53%		
Pure cash deal	283	45.28%	15	25.42%	9	30.00%	268	47.35%		
Pure stock deal	91	14.56%	8	13.56%	3	10.00%	83	14.66%		
Time to resolution (in days)	60.201	79.639	68.454	84.766	60.429	69.309	59.731	79.370	8.7230	0.6980
Advisory fee (Total $millions)	5.1053	14.980	36.592	37.676	6.6500	8.9803	2.0083	4.4350	34.5837	4.6417
Advisory fee (% Deal value)	2.2457	4.9961	0.4392	0.3101	0.3660	0.4002	2.4234	5.2048	-1.9842	-2.0574
Number of observations	625		59		30		566			

Table 4.2 – Advisor-selection decision

Table 4.2 analyses the social connection effect in acquirers' advisor-selection decisions using models developed in Bouwman (2011). This study creates a list of potential investment banks, including selected advisors and the top 100 investment banks ranked by number of deals advised over the sample period from 2005 to 2016. Each acquirer-advisor pair is manually checked for social connections in the BoardEx database. Table 4.2 shows both the coefficients and odds ratio for logit models. In Panel A, the dependent variable is the dummy variable, which equals one if a certain acquirer-advisor is chosen. In Panel B, the dependent variable is the dummy variable, which equals one if a particular investment bank is selected with the subsample of full-service advisor candidates. In Panel C, the dependent variable becomes a dummy variable, which equals one if a particular investment bank is selected with the subsample of boutique advisor candidates. In Panel D and E, the dependent variable is a dummy variable, which equals one if a particular investment bank is selected with the subsample of global boutique advisor candidates and domestic boutique advisors, respectively. In all panels, the independent variables for social connection are dummy variables for first-degree connection and second-degree connection. First-degree connection (so called board interlock) is defined when bidding firms and investment banks share the same board members during the acquisition period while second-degree connection refers to the situation where two individual board members, respectively from bidders and banks, serve on the same board of a third firm during the acquisition period. The deal and investment bank characteristics are controlled in Model 2. In addition, year and industry fixed effects are included in Model 3 for each panel. The definition of explanatory variable is reported in Appendix A. In all of the models, the firm-clustering effects for acquiring firms are considered. For brevity, the results for the industry and year dummies are not reported. Robust t-statistics are reported in brackets. ***, ** and * represent statistical significance at the 1%-, 5%- and 10%-level, respectively.

Panel A full sample

Selected as acquirers' advisor	Coefficient		
	Model 1	Model 2	Model 3
First-degree connection	-0.1076	-0.1051	-0.0720
	(-0.44)	(-0.43)	(-0.29)
Second-degree connection	-2.1305***	-2.1281***	-2.1640***
	(-11.87)	(-11.86)	(-11.92)
Top-tier advisor		1.0384***	1.0384***
		(20.97)	(20.96)
Full-Service advisor		0.7422***	0.7421***
		(13.96)	(13.96)
MA_advisory service		0.3243***	0.3239***
		(3.93)	(3.92)
Constant	-4.4594***	-5.3775***	-5.3575***
	(-363.60)	(-113.49)	(-100.37)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	237,807	237,807	237,807
Pseudo R2	0.019	0.065	0.065

Panel A full sample

Selected as acquirers' advisor	Odds ratio		
	Model 1	Model 2	Model 3
First-degree connection	0.8980	0.9002	0.9305
	(-0.44)	(-0.43)	(-0.29)
Second-degree connection	0.1188***	0.1191***	0.1149***
	(-11.87)	(-11.86)	(-11.92)
Top-tier advisor		2.8246***	2.8246***
		(20.97)	(20.96)
Full-Service advisor		2.1006***	2.1003***
		(13.96)	(13.96)
MA_advisory service		1.3831***	1.3825***
		(3.93)	(3.92)
Constant	0.0116***	0.0046***	0.0047***
	(-363.60)	(-113.49)	(-100.37)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	237,807	237,807	237,807
Pseudo R2	0.019	0.065	0.065

Panel B full-service advisors subsample

Selected as acquirers' advisor	Coefficient		
	Model 1	Model 2	Model 3
First-degree connection	-0.6551**	-0.9191***	-1.0031***
	(-2.12)	(-2.94)	(-3.14)
Second-degree connection	-2.2787***	-2.4898***	-2.5080***
	(-9.25)	(-9.88)	(-9.90)
Deal Size		0.2385***	0.2609***
		(13.35)	(14.32)
Hostile		0.4937	0.4352
		(1.03)	(0.91)
Tender offer		0.1729**	0.1584**
		(2.33)	(2.07)
Toehold		0.0810	0.0463
		(0.57)	(0.33)
Competing		-0.0511	0.0098
		(-0.26)	(0.05)
Public		-0.0198	-0.0593
		(-0.36)	(-1.05)
Diversification		0.0377	0.0079
		(0.71)	(0.14)
Constant	-5.0537***	-6.5367***	-6.2982***
	(-179.00)	(-39.01)	(-35.36)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	216,645	216,645	216,645
Pseudo R2	0.019	0.032	0.035

Panel B full-service advisors subsample

Selected as acquirers' advisor	Odds ratio		
	Model 1	Model 2	Model 3
First-degree connection	0.5194**	0.3989***	0.3667***
	(-2.12)	(-2.94)	(-3.14)
Second-degree connection	0.1024***	0.0829***	0.0814***
	(-9.25)	(-9.88)	(-9.90)
Deal Size		1.2693***	1.2981***
		(13.35)	(14.32)
Hostile		1.6384	1.5453
		(1.03)	(0.91)
Tender offer		1.1887**	1.1717**
		(2.33)	(2.07)
Toehold		1.0844	1.0474
		(0.57)	(0.33)
Competing		0.9502	1.0099
		(-0.26)	(0.05)
Public		0.9804	0.9425
		(-0.36)	(-1.05)
Diversification		1.0384	1.0079
		(0.71)	(0.14)
Constant	0.0064***	0.0014***	0.0018***
	(-179.00)	(-39.01)	(-35.36)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	216,645	216,645	216,645
Pseudo R2	0.019	0.032	0.035

Panel C boutique advisors subsample

Selected as acquirers' advisor	Coefficient		
	Model 1	Model 2	Model 3
First-degree connection	0.7179**	0.6345*	0.7623**
	(2.24)	(1.96)	(2.29)
Second-degree connection	-1.7691***	-1.6030***	-1.6438***
	(-6.83)	(-6.05)	(-6.11)
MA_advisory service		0.5981***	0.5981***
		(5.82)	(5.82)
Deal Size		-0.3220***	-0.3473***
		(-18.22)	(-18.57)
Hostile		0.1236	0.1765
		(0.25)	(0.37)
Tender offer		-0.0209	0.0202
		(-0.13)	(0.13)
Toehold		-0.1917	-0.1753
		(-1.48)	(-1.36)
Competing		0.4775	0.4872
		(1.34)	(1.31)
Public		-0.3015***	-0.2754***
		(-3.40)	(-3.11)
Diversification		0.0494	0.0334
		(0.89)	(0.60)
Constant	-4.3525***	-3.2511***	-3.3905***
	(-172.49)	(-22.45)	(-21.17)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	133,788	133,788	133,788
Pseudo R2	0.013	0.048	0.052

Panel C boutique advisors subsample

Selected as acquirers' advisor	Odds ratio		
	Model 1	Model 2	Model 3
First-degree connection	2.0501**	1.8861*	2.1433**
	(2.24)	(1.96)	(2.29)
Second-degree connection	0.1705***	0.2013***	0.1933***
	(-6.83)	(-6.05)	(-6.11)
MA_advisory service		1.8187***	1.8186***
		(5.82)	(5.82)
Deal Size		0.7247***	0.7066***
		(-18.22)	(-18.57)
Hostile		1.1316	1.1930
		(0.25)	(0.37)
Tender offer		0.9793	1.0204
		(-0.13)	(0.13)
Toehold		0.8256	0.8392
		(-1.48)	(-1.36)
Competing		1.6120	1.6278
		(1.34)	(1.31)
Public		0.7397***	0.7593***
		(-3.40)	(-3.11)
Diversification		1.0507	1.0340
		(0.89)	(0.60)
Constant	0.0129***	0.0387***	0.0337***
	(-172.49)	(-22.45)	(-21.17)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	133,788	133,788	133,788
Pseudo R2	0.013	0.048	0.052

Panel D Global boutique advisors subsample

Selected as acquirers' advisor	Coefficient		
	Model 1	Model 2	Model 3
First-degree connection	0.3644	0.4877	0.7470
	(0.77)	(1.01)	(1.52)
Second-degree connection	-1.8013***	-1.6941***	-1.8011***
	(-4.65)	(-4.39)	(-4.56)
MA_advisory service		0.1202	0.1203
		(0.93)	(0.93)
Deal Size		-0.1109***	-0.1470***
		(-3.43)	(-4.36)
Hostile		1.2136***	1.3800***
		(2.87)	(3.16)
Tender offer		0.4634*	0.4980**
		(1.84)	(2.02)
Toehold		-0.5010**	-0.5084**
		(-2.44)	(-2.48)
Competing		0.2745	0.1094
		(0.53)	(0.20)
Public		-0.5506***	-0.4829***
		(-3.33)	(-2.93)
Diversification		0.0899	0.0722
		(0.80)	(0.63)
Constant	-4.5798***	-3.5211***	-3.7546***
	(-79.19)	(-12.56)	(-11.94)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	38,210	38,210	38,210
Pseudo R2	0.016	0.026	0.040

Panel D Global boutique advisors subsample

Selected as acquirers' advisor	Odds ratio		
	Model 1	Model 2	Model 3
First-degree connection	1.4396	1.6285	2.1108
	(0.77)	(1.01)	(1.52)
Second-degree connection	0.1651***	0.1838***	0.1651***
	(-4.65)	(-4.39)	(-4.56)
MA_advisory service		1.1277	1.1278
		(0.93)	(0.93)
Deal Size		0.8950***	0.8633***
		(-3.43)	(-4.36)
Hostile		3.3656***	3.9748***
		(2.87)	(3.16)
Tender offer		1.5895*	1.6455**
		(1.84)	(2.02)
Toehold		0.6059**	0.6014**
		(-2.44)	(-2.48)
Competing		1.3159	1.1156
		(0.53)	(0.20)
Public		0.5766***	0.6170***
		(-3.33)	(-2.93)
Diversification		1.0940	1.0749
		(0.80)	(0.63)
Constant	0.0103***	0.0296***	0.0234***
	(-79.19)	(-12.56)	(-11.94)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	38,210	38,210	38,210
Pseudo R2	0.016	0.026	0.040

Panel E Domestic boutique advisors subsample

Selected as acquirers' advisor	Coefficient		
	Model 1	Model 2	Model 3
First-degree connection	1.5606***	1.3947***	1.4517***
	(5.98)	(4.70)	(4.37)
Second-degree connection	-1.1612***	-1.3752***	-1.4063***
	(-4.51)	(-4.19)	(-4.24)
MA_advisory service		-2.5090***	-2.5085***
		(-4.99)	(-4.99)
Deal Size		-0.1005***	-0.1061***
		(-3.72)	(-3.55)
Hostile		2.1389**	2.1402**
		(2.18)	(2.15)
Tender offer		0.1175	0.1176
		(0.42)	(0.41)
Toehold		0.0413	0.0876
		(0.15)	(0.30)
Competing		0.5842	0.6386
		(1.11)	(1.17)
Public		-0.1196	-0.1097
		(-0.81)	(-0.73)
Diversification		0.0042	-0.0124
		(0.04)	(-0.12)
Constant	-4.6969***	-4.2096***	-4.2555***
	(-103.05)	(-14.05)	(-12.76)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	53,499	53,499	53,499
Pseudo R2	0.009	0.025	0.026

Panel E Domestic boutique advisors subsample

Selected as acquirers' advisor	Odds ratio		
	Model 1	Model 2	Model 3
First-degree connection	4.7617***	4.0336***	4.2703***
	(5.98)	(4.70)	(4.37)
Second-degree connection	0.3131***	0.2528***	0.2450***
	(-4.51)	(-4.19)	(-4.24)
MA_advisory service		0.0814***	0.0814***
		(-4.99)	(-4.99)
Deal Size		0.9044***	0.8993***
		(-3.72)	(-3.55)
Hostile		8.4903**	8.5011**
		(2.18)	(2.15)
Tender offer		1.1247	1.1248
		(0.42)	(0.41)
Toehold		1.0422	1.0916
		(0.15)	(0.30)
Competing		1.7936	1.8937
		(1.11)	(1.17)
Public		0.8873	0.8961
		(-0.81)	(-0.73)
Diversification		1.0042	0.9876
		(0.04)	(-0.12)
Constant	0.0091***	0.0149***	0.0142***
	(-103.05)	(-14.05)	(-12.76)
Year-fixed-effects	No	No	Yes
Industry-fixed-effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	53,499	53,499	53,499
Pseudo R2	0.009	0.025	0.026

Table 4.3 – Acquisition premium analysis

Table 4.3 shows the multivariate regression results for acquisition premium analysis. Offer premium is computed for both public and private deals. The premium analysis is shown for public and private acquisition in Panel A, and the results for public deals only in Panel B. Acquisition premium in public deals is measured as the log percentage difference between offer price and target stock price four weeks before the takeover announcement. The premium for private deals is calculated by multiplying the average premium for comparable portfolio by one plus the acquisition discount (Officer, 2007) and then taking the logarithm of the premium. In each panel, the full sample is classified by types of advisors. The regression results are reported for the full sample and subsample of deals advised by full-service banks, boutique banks and domestic boutique banks, respectively. The independent variables for social connection are dummy variables for first-degree connection and second-degree connection. First-degree connection (so called board interlock) is defined when bidding firms and investment banks share the same board members during the acquisition period while second-degree connection refers to the situation where two individual board members, respectively from bidders and banks, serve on the same board of a third firm during the acquisition period. The deal and investment bank characteristics are controlled in Model 2 for each panel. Year and industry fixed effects are included in Model 3 for each panel. The definition for explanatory variable is reported in Appendix A. In all of the models, the firm-clustering effects for acquiring firms are considered. For brevity, the results for the industry and year dummies are not reported. Robust t-statistics are reported in brackets. ***, ** and * represent statistical significance at the 1%-, 5%- and 10%-level, respectively.

Panel A Public and Private deals

Acquisition Premium	Full sample			Full service subsample			Boutique subsample		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
First-degree connection	0.0562	0.0382	0.2340	0.7102***	0.7839***	0.7896***	-0.8971***	-0.9744***	-0.8705**
	(0.22)	(0.14)	(1.01)	(4.41)	(4.27)	(3.70)	(-5.78)	(-4.50)	(-2.54)
Second-degree connection	0.5339*	0.7885***	0.7326**	0.5246***	0.5980***	0.5788***	0.2480	0.8715	0.6783
	(1.78)	(2.81)	(2.47)	(3.35)	(3.16)	(2.62)	(0.46)	(1.24)	(0.81)
Relative deal size		-0.0563*	-0.0587*		-0.0467	-0.0619		-0.0458	-0.0303
		(-1.73)	(-1.75)		(-1.27)	(-1.56)		(-0.72)	(-0.35)
Tender offer		0.1257**	0.2151**		0.2083*	0.2529**		0.0248	0.0666
		(2.24)	(2.25)		(1.96)	(2.49)		(0.10)	(0.26)
Pure Cash Deal		-0.3284**	-0.3396**		-0.4809***	-0.4940***		-0.2938	-0.2834
		(-2.26)	(-2.21)		(-2.73)	(-2.72)		(-1.08)	(-0.91)
Diversification		0.1149	0.1511*		0.0312	0.0754		0.2605	0.3754*
		(1.24)	(1.67)		(0.30)	(0.71)		(1.33)	(1.88)
Competing		0.1138	0.0306		0.0942	-0.0398		0.1532	0.0645
		(0.65)	(0.15)		(0.56)	(-0.22)		(0.48)	(0.13)
Constant	-1.3365***	-0.9480***	-1.3141***	-1.3912***	-0.9761***	-1.1051***	-1.1271***	-0.9556**	-1.2746**
	(-29.38)	(-3.90)	(-4.60)	(-29.33)	(-3.46)	(-3.78)	(-11.00)	(-2.10)	(-2.03)
Year-fixed effects	No	No	Yes	No	No	Yes	No	No	Yes
Industry fixed effects	No	No	Yes	No	No	Yes	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	729	729	729	515	515	515	214	214	214
Adjusted R2	0.002	0.017	0.102	0.006	0.027	0.074	0.006	0.010	0.026

Panel A Public and Private deals (Continued)

Acquisition Premium	Domestic Boutique subsample		
	Model 1	Model 2	Model 3
First-degree connection	-0.8429***	-0.8289**	-0.9783***
	(-3.09)	(-2.61)	(-2.66)
Second-degree connection	0.6908	1.7893**	0.4271
	(0.57)	(2.63)	(0.62)
Relative deal size		-0.1061	-0.0977
		(-1.40)	(-1.31)
Tender offer		0.1453	0.0163
		(0.33)	(0.04)
Pure Cash Deal		0.1091	0.1640
		(0.32)	(0.46)
Diversification		0.3925	0.4534
		(1.28)	(1.41)
Competing		0.5294**	1.1008***
		(2.26)	(3.34)
Constant	-1.1373***	-0.8967*	-1.6351**
	(-7.66)	(-1.72)	(-2.28)
Year-fixed effects	No	No	Yes
Industry fixed effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	114	114	114
Adjusted R2	0.002	0.015	0.157

Panel B Public takeover deals

Acquisition Premium	Full sample			Full service subsample			Boutique subsample		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
First-degree connection	-0.3435*	-0.3254	-0.0295	0.5529***	0.7611***	0.7293***	-1.0484***	-1.1455***	-0.9189***
	(-1.81)	(-1.20)	(-0.13)	(2.84)	(2.94)	(3.00)	(-6.96)	(-6.24)	(-3.26)
Second-degree connection	0.1901	0.5335***	0.4990*	0.4760***	0.5824***	0.5707**	-0.4320*	0.2232	-0.4446
	(0.83)	(2.81)	(1.71)	(2.72)	(2.68)	(2.33)	(-1.71)	(0.76)	(-1.01)
Relative deal size		-0.0826***	-0.0858***		-0.0651*	-0.0796**		-0.0594	0.0040
		(-2.60)	(-2.59)		(-1.77)	(-1.97)		(-1.14)	(0.06)
Tender offer		-0.2379**	-0.3195***		-0.2855***	-0.3274***		-0.1447	-0.1899
		(-2.39)	(-3.41)		(-2.70)	(-3.26)		(-0.71)	(-0.80)
Pure Cash Deal		-0.4186***	-0.3792**		-0.5522***	-0.5386***		-0.3763*	-0.2125
		(-2.87)	(-2.48)		(-3.03)	(-2.88)		(-1.72)	(-0.90)
Diversification		0.1352	0.1575*		0.0802	0.1076		0.0766	0.1254
		(1.53)	(1.79)		(0.79)	(1.02)		(0.45)	(0.70)
Competing		0.1220	0.0264		0.0714	-0.0689		0.2214	0.3177
		(0.71)	(0.13)		(0.41)	(-0.38)		(1.06)	(0.96)
Constant	-1.2791***	-0.6596***	-0.9570***	-1.3621***	-0.7829***	-0.8914***	-0.9757***	-0.5925*	-1.1856**
	(-28.23)	(-2.80)	(-3.59)	(-28.93)	(-2.74)	(-3.09)	(-10.25)	(-1.68)	(-2.21)
Year-fixed effects	No	No	Yes	No	No	Yes	No	No	Yes
Industry-fixed effects	No	No	Yes	No	No	Yes	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	459	459	459	345	345	345	114	114	114
Adjusted R2	0.002	0.033	0.115	0.007	0.055	0.144	0.053	0.095	0.277

Panel B Public takeover deals (Continued)

Acquisition Premium	Domestic Boutique subsample		
	Model 1	Model 2	Model 3
First-degree connection	-1.3321***	-1.6580***	-1.4137**
	(-3.65)	(-9.27)	(-2.52)
Second-degree connection	0.0572	0.3590	0.5967
	(0.18)	(1.33)	(1.31)
Relative deal size		-0.0406	-0.0821
		(-0.72)	(-1.44)
Tender offer		0.0274	0.0733
		(0.12)	(0.22)
Pure Cash Deal		0.0597	-0.1457
		(0.28)	(-0.65)
Diversification		0.0665	0.0457
		(0.34)	(0.20)
Competing		0.9056**	0.6439
		(2.59)	(1.48)
Constant	-1.0807***	-0.9499**	-0.4275
	(-11.13)	(-2.33)	(-0.85)
Year-fixed effects	No	No	Yes
Industry-fixed effects	No	No	Yes
Firm-clustering effects	Yes	Yes	Yes
Observations	83	83	83
Adjusted R2	0.045	0.124	0.361

Table 4.4 – Announcement return analysis

Table 4.4 presents the multivariate analysis for the announcement return for acquirers, targets and combined firms of bidders and targets. The five-day event (from 2 days before to 2 days after the takeover announcement) cumulative abnormal return is calculated on the market model with an estimation period starting 365 days and ending 4 weeks before the M&A deal announcement. In Panel A, Panel B and Panel C, the dependent variables are announcement returns for acquirers, targets and combined firms, respectively. In each panel, the full sample is classified by types of advisors. Regression results are reported for the full sample and subsample of deals advised by full-service banks and boutique banks, respectively. The independent variables for social connection are dummy variables for first-degree connection and second-degree connection. First-degree connection (so-called board interlock) is defined when bidding firms and investment banks share the same board members during the acquisition period while second-degree connection refers to the situation where two individual board members, respectively from bidders and banks, serve on the same board of a third firm during the acquisition period. The deal and investment bank characteristics are controlled in Model 1. Year and industry fixed effects are controlled in Model 2 for each panel. The definition for the explanatory variable is reported in Appendix A. In all of the models, the firm-clustering effects for acquiring firms are considered. For brevity, the results for the industry and year dummies are not reported. Robust t-statistics are reported in brackets. ***, ** and * represent statistical significance at the 1%-, 5%- and 10%-level, respectively.

Panel A

Acquirer CAR(-2,+2)	Full sample		Full service		Boutique	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
First-degree connection	-0.0273	-0.0305	-0.0458	-0.0348	-0.0275	-0.0374
	(-0.57)	(-0.62)	(-0.63)	(-0.45)	(-0.39)	(-0.51)
Second-degree connection	-0.0045	-0.0041	0.0029	0.0038	-0.0061	0.0082
	(-0.15)	(-0.13)	(0.09)	(0.11)	(-0.10)	(0.12)
Acquirer Tobin's Q	0.0001	0.0001	0.0002	0.0003	-0.0018	-0.0011
	(0.21)	(0.23)	(0.67)	(0.87)	(-1.36)	(-0.80)
Target Tobin's Q	-0.0002	-0.0001	-0.0002	-0.0003	0.0003	0.0005
	(-0.34)	(-0.21)	(-0.46)	(-0.51)	(0.24)	(0.34)
Acquirer Leverage	0.0509**	0.0452**	0.0507**	0.0350	0.0515	0.0703
	(2.45)	(2.02)	(2.24)	(1.43)	(1.28)	(1.60)
Target Tobin's Q	0.0203	0.0233	0.0381*	0.0413*	0.0176	0.0226
	(1.35)	(1.51)	(1.87)	(1.94)	(0.68)	(0.83)
Relative deal size	-0.0018	-0.0027	-0.0036	-0.0051*	-0.0008	-0.0015
	(-0.74)	(-1.07)	(-1.26)	(-1.71)	(-0.15)	(-0.27)
Hostile	0.0974*	0.1237**	0.0943	0.1584**	0.1386	0.1520
	(1.65)	(2.03)	(1.29)	(2.11)	(1.02)	(1.01)
Pure Cash Deal	0.0463***	0.0452***	0.0449***	0.0456***	0.0502**	0.0486**
	(5.93)	(5.53)	(5.31)	(5.18)	(2.61)	(2.29)
Competing	0.0205	0.0170	0.0236	0.0249	0.0018	-0.0305
	(1.13)	(0.92)	(1.24)	(1.29)	(0.04)	(-0.60)
Diversification	-0.0144*	-0.0144*	-0.0195**	-0.0178**	-0.0055	-0.0147
	(-1.77)	(-1.74)	(-2.22)	(-1.99)	(-0.27)	(-0.69)
Constant	-0.0217	-0.0203	-0.0092	-0.0121	-0.0331	-0.0120
	(-1.24)	(-1.06)	(-0.44)	(-0.54)	(-0.94)	(-0.29)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1563	1563	938	938	625	625
Adjusted R2	0.083	0.090	0.101	0.113	-0.001	0.045

Panel B

Target CAR(-2,+2)	Full sample		Full service		Boutique	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
First-degree connection	0.0547	0.1719	0.5358**	0.5848**	-0.2641**	-0.2464**
	(0.37)	(1.18)	(2.36)	(2.51)	(-2.22)	(-2.02)
Second-degree connection	-0.1219	-0.0342	-0.1222	-0.0465		
	(-1.01)	(-0.29)	(-1.07)	(-0.41)		
Acquirer Tobin's Q	0.0035***	0.0030**	0.0017	0.0015	0.0148***	0.0128***
	(2.91)	(2.57)	(1.38)	(1.29)	(4.52)	(4.49)
Target Tobin's Q	-0.0019	-0.0016	-0.0035**	-0.0029*	0.0054*	0.0016
	(-1.26)	(-1.12)	(-2.28)	(-1.94)	(1.85)	(0.51)
Acquirer Leverage	-0.0649	-0.0654	0.1141	0.0597	-0.4141***	-0.3201**
	(-0.92)	(-0.91)	(1.41)	(0.72)	(-3.10)	(-2.26)
Target Tobin's Q	0.0944*	0.0885*	-0.0974	-0.0913	0.2716***	0.2629***
	(1.92)	(1.83)	(-1.41)	(-1.30)	(3.06)	(3.44)
Relative deal size	-0.0116	-0.0100	-0.0133	-0.0135	0.0051	0.0179
	(-1.54)	(-1.30)	(-1.48)	(-1.49)	(0.24)	(0.67)
Hostile	0.0067	0.0034	0.1910	0.1151	0.1917	0.0382
	(0.05)	(0.02)	(0.84)	(0.51)	(1.52)	(0.25)
Pure Cash Deal	0.0608**	0.0520**	0.0508*	0.0452*	0.0109	-0.0195
	(2.41)	(2.07)	(1.88)	(1.68)	(0.17)	(-0.30)
Competing	-0.0409	-0.0634	-0.0272	-0.0562	0.0324	0.0564
	(-0.74)	(-1.17)	(-0.46)	(-0.96)	(0.22)	(0.37)
Diversification	0.0799***	0.0924***	0.0769***	0.0858***	0.0537	0.1040
	(3.06)	(3.63)	(2.77)	(3.12)	(0.87)	(1.35)
Constant	0.2346***	0.2065***	0.2574***	0.2136***	0.1608	0.1506
	(4.16)	(3.47)	(3.81)	(3.05)	(1.33)	(1.01)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	476	476	369	369	107	107
Adjusted R2	0.053	0.141	0.065	0.136	0.265	0.359

Panel C:

Combined CAR(-2,+2)	**Full sample**		**Full service**		**Boutique**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
First-degree connection	0.0388	0.0595	0.1305*	0.1650**	0.0014	-0.0454
	(0.96)	(1.40)	(1.95)	(2.35)	(0.02)	(-0.73)
Second-degree connection	-0.0418	-0.0236	-0.0386	-0.0229		
	(-1.19)	(-0.66)	(-1.14)	(-0.67)		
Acquirer Tobin's Q	-0.0003	-0.0003	-0.0002	-0.0001	-0.0014	-0.0017
	(-0.79)	(-0.74)	(-0.47)	(-0.20)	(-0.93)	(-0.88)
Target Tobin's Q	0.0002	0.0002	-0.0001	-0.0002	0.0014*	0.0017*
	(0.54)	(0.44)	(-0.14)	(-0.39)	(1.79)	(1.81)
Acquirer Leverage	0.0459**	0.0249	0.0676**	0.0304	-0.0291	-0.0206
	(2.01)	(1.00)	(2.57)	(1.06)	(-0.54)	(-0.30)
Target Tobin's Q	-0.0070	-0.0055	-0.0039	-0.0019	-0.0160	-0.0167
	(-0.46)	(-0.36)	(-0.18)	(-0.08)	(-1.38)	(-0.81)
Relative deal size	0.0013	0.0001	0.0011	-0.0007	-0.0021	0.0019
	(0.57)	(0.05)	(0.40)	(-0.25)	(-0.30)	(0.24)
Tender Offer	0.0047	0.0055	0.0022	0.0032	0.0194	0.0199
	(0.55)	(0.64)	(0.25)	(0.35)	(0.87)	(0.71)
Pure Cash Deal	0.0180**	0.0174**	0.0183**	0.0191**	0.0052	-0.0114
	(2.19)	(2.06)	(2.09)	(2.16)	(0.17)	(-0.36)
Competing	0.0290*	0.0272	0.0348*	0.0349*	0.0123	-0.0145
	(1.66)	(1.50)	(1.87)	(1.83)	(0.23)	(-0.27)
Diversification	-0.0072	-0.0067	-0.0141	-0.0112	0.0338	0.0373
	(-0.88)	(-0.80)	(-1.58)	(-1.23)	(1.38)	(1.57)
Constant	0.0112	0.0092	0.0104	0.0108	0.0343	0.0321
	(0.65)	(0.51)	(0.51)	(0.51)	(0.92)	(0.77)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	476	476	369	369	107	107
Adjusted R2	0.014	0.016	0.044	0.062	0.0035	0.0080

Table 4.5 – Buy-and-hold return (BHAR) analysis

Table 4.5 reports the relationship between social connection and long-run stock performance, measured using buy-and-hold return (BHAR). BHAR is computed as the difference between the buy-and-hold return of acquirers and the buy-and-hold return of reference portfolios. Following Bouwman et al. (2009), 50 reference portfolios are identified for acquiring firms, classified by their market valuation and Tobin's Q ratio. Then, the buy-and-hold return of reference portfolios is calculated by compounding the average return of each portfolio for the event period. Finally, the size-adjusted BHAR is obtained by subtracting the BHAR of the reference portfolio from the BHAR of the acquiring firms. This study includes the acquirers' buy-and-hold return for 3-month, 6-month, 9-month, 12-month, 24-month and 36-month periods. In Panel A, Panel B and Panel C, the full sample is classified by types of advisors. Regression results are reported for the full sample and subsample of deals advised by full-service banks and boutique banks, respectively. The independent variables for social connection are dummy variables for first-degree connection and second-degree connection. First-degree connection (so-called board interlock) is defined when bidding firms and investment banks share the same board members during the acquisition period while second-degree connection refers to the situation where two individual board members, respectively from bidders and banks, serve on the same board of a third firm during the acquisition period. The deal and investment bank characteristics are controlled in Model 1. Year and industry fixed effects are included in Model 2 for each panel. The definition for explanatory variables is reported in Appendix. In all of the models, the firm-clustering effects for acquiring firms are considered. For brevity, the results for the industry and year dummies are not reported. Robust t-statistics are reported in brackets. ***, ** and * represent statistical significance at the 1%-, 5%- and 10%-level, respectively.

Panel A

Full sample	**BHAR_3m**		**BHAR_6m**		**BHAR_9m**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
First-degree connection	0.0785*	0.0778*	0.0754	0.0766	0.0591	0.0833
	(1.88)	(1.72)	(1.03)	(0.98)	(0.78)	(0.96)
Second-degree connection	0.0134	0.0049	0.0087	-0.0004	0.0304	0.0164
	(0.64)	(0.19)	(0.25)	(-0.01)	(0.60)	(0.32)
Acquirer Tobin's Q	-0.0009*	-0.0008	-0.0014	-0.0014	-0.0015	-0.0013
	(-1.76)	(-1.51)	(-1.11)	(-1.05)	(-1.54)	(-1.27)
Acquirer Leverage	-0.0088	-0.0214	0.0972	0.1054	0.1064	0.1067
	(-0.25)	(-0.58)	(1.19)	(1.36)	(1.16)	(1.26)
Relative Deal Size	0.0049	0.0070	0.0038	0.0117	-0.0076	-0.0010
	(0.49)	(0.69)	(0.21)	(0.67)	(-0.39)	(-0.05)
Tender offer	-0.0118	-0.0108	-0.0119	-0.0139	-0.0396	-0.0331
	(-0.79)	(-0.69)	(-0.47)	(-0.54)	(-1.35)	(-1.11)
Pure Stock deal	-0.0710***	-0.0687***	-0.0699*	-0.0678*	-0.1172***	-0.1182***
	(-2.86)	(-2.79)	(-1.84)	(-1.79)	(-2.92)	(-2.96)
Toehold	-0.0130	-0.0195	-0.0740	-0.0930	-0.1119**	-0.1148**
	(-0.45)	(-0.67)	(-1.12)	(-1.39)	(-2.03)	(-2.03)
Competing	-0.0122	-0.0148	-0.0041	-0.0049	0.0227	0.0187
	(-0.45)	(-0.52)	(-0.11)	(-0.11)	(0.35)	(0.27)
Diversification	0.0088	0.0102	0.0024	-0.0034	0.0124	0.0123
	(0.74)	(0.82)	(0.13)	(-0.18)	(0.52)	(0.50)
Constant	0.0072	0.0092	0.0346	0.0611	0.0739	0.0612
	(0.24)	(0.28)	(0.49)	(0.83)	(1.26)	(0.96)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1563	1563	1064	1064	1058	1058
Adjusted R2	0.007	0.016	0.003	0.015	0.008	0.018

Panel A (Continued)

Full sample	BHAR_12m		BHAR_24m		BHAR_36m	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
First-degree connection	0.0128	0.0437	-0.1224	-0.1125	-0.1434	-0.1477
	(0.18)	(0.54)	(-1.39)	(-1.25)	(-1.09)	(-0.99)
Second-degree connection	0.0782	0.0707	0.0417	0.0617	0.1056	0.1241
	(1.33)	(1.11)	(0.74)	(0.92)	(0.89)	(1.02)
Acquirer Tobin's Q	-0.0015	-0.0012	-0.0024	-0.0022	-0.0011	-0.0015
	(-1.21)	(-0.95)	(-1.31)	(-1.12)	(-0.46)	(-0.61)
Acquirer Leverage	0.1646	0.1549	0.1725	0.1961	0.3039	0.3325
	(1.34)	(1.42)	(1.08)	(1.26)	(1.29)	(1.51)
Relative Deal Size	0.0036	0.0104	-0.0352	-0.0250	-0.0492	-0.0465
	(0.15)	(0.45)	(-1.56)	(-1.12)	(-0.77)	(-0.71)
Tender offer	-0.0587*	-0.0571*	-0.0357	-0.0313	-0.0780	-0.0851
	(-1.91)	(-1.83)	(-0.62)	(-0.53)	(-1.16)	(-1.19)
Pure Stock deal	-0.1322**	-0.1285**	-0.1323*	-0.1099	-0.1021	-0.0997
	(-2.55)	(-2.47)	(-1.84)	(-1.49)	(-1.20)	(-1.12)
Toehold	-0.1667**	-0.1632**	-0.0711	-0.1054	0.0508	0.0199
	(-2.42)	(-2.32)	(-0.55)	(-0.80)	(0.29)	(0.11)
Competing	0.0662	0.0780	0.0407	0.0315	-0.2065*	-0.2098
	(0.77)	(0.88)	(0.28)	(0.20)	(-1.68)	(-1.49)
Diversification	0.0052	0.0040	-0.0297	-0.0302	-0.0624	-0.0624
	(0.19)	(0.14)	(-0.68)	(-0.65)	(-1.07)	(-1.00)
Constant	0.1105	0.0801	0.0617	0.1002	-0.0419	-0.0080
	(1.53)	(1.06)	(0.46)	(0.72)	(-0.24)	(-0.04)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1046	1046	877	877	727	727
Adjusted R2	0.012	0.023	0.001	0.003	0.001	0.012

Panel B

Full service sample	BHAR_3m		BHAR_6m		BHAR_9m	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
First-degree connection	-0.0171*	-0.0214**	-0.0182**	-0.0174*	-0.0527***	-0.0491**
	(-1.66)	(-1.97)	(-1.99)	(-1.80)	(-2.91)	(-2.58)
Second-degree connection	-0.0002	-0.0012	-0.0014	0.0005	-0.0153	-0.0158
	(-0.02)	(-0.11)	(-0.13)	(0.03)	(-0.67)	(-0.65)
Acquirer Tobin's Q	-0.0001	-0.0001	-0.0002	-0.0002	-0.0002	-0.0001
	(-0.59)	(-0.50)	(-0.99)	(-1.01)	(-0.79)	(-0.58)
Acquirer Leverage	0.0000	-0.0010	0.0183	0.0106	0.0038	-0.0084
	(0.00)	(-0.09)	(0.89)	(0.55)	(0.18)	(-0.43)
Relative Deal Size	0.0022	0.0017	-0.0071*	-0.0071	-0.0062	-0.0059
	(0.58)	(0.45)	(-1.69)	(-1.62)	(-0.98)	(-0.88)
Tender offer	-0.0037	-0.0067	-0.0105	-0.0130*	-0.0094	-0.0082
	(-0.71)	(-1.28)	(-1.33)	(-1.66)	(-1.04)	(-0.92)
Pure Stock deal	0.0054	0.0036	0.0026	0.0016	0.0061	0.0059
	(0.78)	(0.52)	(0.26)	(0.17)	(0.62)	(0.57)
Toehold	0.0038	0.0017	-0.0136	-0.0124	-0.0115	-0.0067
	(0.57)	(0.22)	(-1.44)	(-1.11)	(-0.88)	(-0.47)
Competing	-0.0084	-0.0057	-0.0089	-0.0064	-0.0294	-0.0296
	(-0.71)	(-0.52)	(-0.48)	(-0.36)	(-1.25)	(-1.27)
Diversification	-0.0013	-0.0023	-0.0031	-0.0054	-0.0004	-0.0011
	(-0.37)	(-0.64)	(-0.62)	(-1.00)	(-0.06)	(-0.17)
Constant	-0.0024	0.0007	0.0152	0.0182	0.0146	0.0107
	(-0.34)	(0.08)	(1.51)	(1.45)	(1.06)	(0.65)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	938	938	897	897	879	879
Adjusted R2	0.008	0.004	0.002	0.012	0.001	0.006

Panel B (Continued)

Full service sample	BHAR_12m		BHAR_24m		BHAR_36m	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
First-degree connection	-0.0715***	-0.0656**	-0.2857**	-0.3260**	-0.4572***	-0.4602**
	(-3.40)	(-2.48)	(-2.11)	(-1.99)	(-3.08)	(-2.10)
Second-degree connection	-0.0157	-0.0115	0.0720	0.0659	0.0064	-0.0047
	(-0.89)	(-0.55)	(0.89)	(0.63)	(0.05)	(-0.03)
Acquirer Tobin's Q	0.0002	0.0002	0.0003	0.0006	0.0007	0.0011
	(0.52)	(0.64)	(0.16)	(0.34)	(0.28)	(0.40)
Acquirer Leverage	-0.0129	-0.0332	-0.0412	0.0148	0.0096	0.0649
	(-0.50)	(-1.34)	(-0.33)	(0.11)	(0.05)	(0.31)
Relative Deal Size	0.0109	0.0104	0.0178	0.0335	-0.0005	0.0139
	(0.63)	(0.62)	(0.37)	(0.67)	(-0.01)	(0.21)
Tender offer	-0.0185*	-0.0207*	-0.0511	-0.0397	-0.1130	-0.1041
	(-1.71)	(-1.81)	(-0.80)	(-0.61)	(-1.52)	(-1.35)
Pure Stock deal	0.0035	0.0042	-0.1818**	-0.1609**	-0.1408	-0.1489
	(0.24)	(0.29)	(-2.35)	(-2.03)	(-1.54)	(-1.56)
Toehold	-0.0223	-0.0164	-0.1318	-0.1737	-0.1150	-0.1377
	(-1.39)	(-0.94)	(-0.98)	(-1.20)	(-0.65)	(-0.70)
Competing	-0.0231	-0.0191	0.0477	0.0275	-0.2165	-0.2279
	(-0.92)	(-0.82)	(0.27)	(0.15)	(-1.37)	(-1.25)
Diversification	-0.0006	-0.0027	-0.0084	-0.0052	0.0027	0.0209
	(-0.07)	(-0.30)	(-0.16)	(-0.09)	(0.04)	(0.29)
Constant	0.0254	0.0168	0.1338	0.1803	0.1596	0.1975
	(1.49)	(0.84)	(0.98)	(1.15)	(0.88)	(0.92)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	872	872	743	743	632	632
Adjusted R2	0.000	0.003	0.006	0.007	0.007	0.0025

Panel C

Boutique sample	BHAR_3m		BHAR_6m		BHAR_9m	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
First-degree connection	0.1532**	0.1385**	0.2165**	0.2035**	0.2430**	0.2475**
	(2.59)	(2.31)	(2.35)	(2.29)	(2.40)	(2.13)
Second-degree connection	-0.0273	-0.0320	-0.0816**	-0.0642	0.0560	0.0587
	(-1.17)	(-1.00)	(-2.05)	(-1.22)	(0.51)	(0.52)
Acquirer Tobin's Q	-0.0020	-0.0019	-0.0037	-0.0037	-0.0053*	-0.0052*
	(-1.35)	(-1.12)	(-1.30)	(-1.31)	(-1.82)	(-1.66)
Acquirer Leverage	-0.0459	-0.0557	0.0378	0.0669	0.0749	0.1175
	(-0.87)	(-1.02)	(0.39)	(0.63)	(0.62)	(0.91)
Relative Deal Size	0.0010	0.0015	0.0042	0.0129	-0.0088	0.0047
	(0.15)	(0.25)	(0.23)	(0.78)	(-0.35)	(0.21)
Tender offer	-0.0140	-0.0110	-0.0160	-0.0426	-0.0627	-0.0630
	(-0.59)	(-0.39)	(-0.27)	(-0.72)	(-0.89)	(-0.88)
Pure Stock deal	-0.1075***	-0.0992**	-0.0933	-0.1011	-0.1561**	-0.1583***
	(-2.74)	(-2.56)	(-1.52)	(-1.64)	(-2.44)	(-2.61)
Toehold	-0.0908	-0.0879	-0.0648	-0.0808	-0.1354	-0.1425
	(-1.33)	(-1.45)	(-0.78)	(-1.25)	(-1.06)	(-1.31)
Competing	-0.1514**	-0.1305*	-0.1711***	-0.1630***	-0.1396	-0.1088
	(-2.40)	(-1.92)	(-3.29)	(-3.27)	(-1.19)	(-0.86)
Diversification	0.0079	0.0079	-0.0115	0.0022	-0.0179	-0.0087
	(0.41)	(0.38)	(-0.38)	(0.07)	(-0.46)	(-0.21)
Constant	0.0908	0.0825	0.0470	0.0685	0.1196	0.1056
	(1.28)	(1.24)	(0.53)	(0.88)	(0.91)	(0.87)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	625	625	562	562	478	478
Adjusted R2	0.039	0.048	0.008	0.025	0.017	0.029

Panel C (Continued)

Boutique sample	BHAR_12m		BHAR_24m		BHAR_36m	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
First-degree connection	0.1418	0.1469	0.0221	-0.0078	0.1457	0.1012
	(1.45)	(1.36)	(0.21)	(-0.07)	(0.71)	(0.44)
Second-degree connection	0.0872	0.0823	-0.0068	0.0847	0.2163	0.3528
	(0.76)	(0.65)	(-0.07)	(0.68)	(1.21)	(1.53)
Acquirer Tobin's Q	-0.0076*	-0.0075*	-0.0163**	-0.0142**	-0.0141	-0.0167
	(-1.79)	(-1.77)	(-2.33)	(-2.12)	(-1.19)	(-1.50)
Acquirer Leverage	0.1069	0.1654	0.1574	0.1588	0.4419*	0.5150*
	(0.70)	(0.99)	(0.85)	(0.81)	(1.71)	(1.82)
Relative Deal Size	-0.0044	0.0129	-0.0569***	-0.0442**	-0.1114	-0.1214
	(-0.14)	(0.45)	(-3.07)	(-2.17)	(-0.92)	(-1.00)
Tender offer	-0.0833	-0.0755	0.0741	0.0815	0.0705	0.0669
	(-1.38)	(-1.19)	(0.52)	(0.55)	(0.48)	(0.42)
Pure Stock deal	-0.1155	-0.1172	-0.0537	-0.0581	0.0216	0.0182
	(-1.30)	(-1.41)	(-0.47)	(-0.51)	(0.12)	(0.11)
Toehold	-0.1781	-0.1958*	-0.0110	-0.0438	0.2749	0.1917
	(-1.27)	(-1.65)	(-0.04)	(-0.16)	(0.91)	(0.77)
Competing	-0.0618	-0.0332	-0.1298	-0.1035	-0.2889**	-0.2362
	(-0.47)	(-0.26)	(-1.33)	(-0.72)	(-1.99)	(-1.32)
Diversification	-0.0182	-0.0102	-0.0360	-0.0206	-0.1229	-0.1285
	(-0.43)	(-0.23)	(-0.56)	(-0.30)	(-1.30)	(-1.29)
Constant	0.1434	0.1345	0.0276	0.0448	-0.2907	-0.3079
	(0.99)	(1.05)	(0.10)	(0.16)	(-0.92)	(-1.09)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	449	449	378	378	297	297
Adjusted R2	0.007	0.020	0.007	0.003	0.006	0.009

Table 4.6 – Industry-adjusted return on asset

Table 4.6 presents the regression results for acquirers' post-acquisition operating performance. The post-acquisition operating performance is measured by industry-adjusted return on assets (IAROA). IAROA is obtained by deducting the median ROA of the bidder's industry with the identical first two-digit SIC codes from the ROA of each acquirer. The full sample is classified by types of advisors. Regression results are reported for the full sample and subsample of deals advised by full-service banks and boutique banks. The dependent variable is acquirers' IAROA for the fiscal year following takeover announcement. The independent variables for social connection are dummy variables for first-degree connection and second-degree connection. First-degree connection (so-called board interlock) is defined when bidding firms and investment banks share the same board members during the acquisition period while second-degree connection refers to the situation where two individual board members, respectively from bidders and banks, serve on the same board of a third firm during the acquisition period. The deal and investment bank characteristics are controlled in Model 1. Year and industry fixed effects are included in Model 2 for each panel. The definition for explanatory variable is reported in the Appendix. In all of the models, the firm-clustering effects for acquiring firms are considered. For brevity, the results for the industry and year dummies are not reported. Robust t-statistics are reported in brackets. ***, ** and * represent statistical significance at the 1%-, 5%- and 10%-level, respectively.

Acquirer _ IAROA Post one year	Full sample		Full service		Boutique	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
First-degree connection	0.0472*	0.0558	0.0540	0.0547	0.0742*	0.0871**
	(1.69)	(1.58)	(1.41)	(1.10)	(1.74)	(2.17)
Second-degree connection	0.0249	0.0255	0.0148	0.0172	0.0315	0.0398
	(0.97)	(0.78)	(0.43)	(0.43)	(0.86)	(1.06)
Acquirer Tobin's Q	0.0004	0.0003	0.0006	0.0004	-0.0029	-0.0027
	(0.52)	(0.35)	(0.76)	(0.55)	(-1.14)	(-0.88)
Acquirer Leverage	-0.0010	-0.0009	-0.0015	-0.0009	0.0037	0.0022
	(-0.70)	(-0.57)	(-0.98)	(-0.57)	(1.03)	(0.52)
Acquirer Return on Equity	0.3945***	0.3968***	0.3477**	0.3281***	0.2955***	0.2998***
	(4.68)	(12.89)	(2.19)	(7.99)	(3.03)	(2.83)
Relative Deal Size	-0.0050	-0.0049	-0.0065	-0.0054	-0.0045	-0.0046
	(-1.14)	(-1.26)	(-1.17)	(-1.37)	(-0.56)	(-0.56)
Tender offer	0.0432***	0.0575***	0.0449***	0.0555***	0.0221	0.0319
	(3.03)	(4.17)	(2.71)	(4.05)	(0.95)	(1.23)
Pure Cash Deal	0.0332***	0.0327***	0.0235**	0.0259***	0.0615***	0.0598***
	(3.33)	(3.76)	(2.21)	(2.73)	(3.45)	(3.46)
Competing	0.0192	0.0061	0.0199	0.0058	0.1037*	0.0648
	(0.65)	(0.19)	(0.60)	(0.18)	(1.68)	(1.29)
Toehold	-0.0590**	-0.0553**	-0.0046	-0.0004	-0.1229***	-0.1090***
	(-2.44)	(-2.21)	(-0.22)	(-0.01)	(-3.28)	(-2.88)
Constant	0.0475*	0.0357	0.0113	-0.0038	0.0934**	0.0782*
	(1.92)	(1.27)	(0.50)	(-0.12)	(2.48)	(1.71)
Year-fixed-effects	No	Yes	No	Yes	No	Yes
Industry-fixed-effects	No	Yes	No	Yes	No	Yes
Firm-clustering effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1563	1563	938	938	625	625
Adjusted R2	0.146	0.264	0.105	0.259	0.134	0.218

Table 4.7 – Cash flow performance analysis

Table 4.7 shows the analysis of acquirers' post-acquisition cash flow performance. Cash flow performance is measured by acquirers' operating cash flow gauged by total assets. The cash flow performance is adjusted by subtracting the median cash flow ratio of the sample firms (excluding acquiring firm itself) who are in the same industry and in the same decile of excess cash reserve ratio with acquirers. The dependent variable is the cash flow ratio of the acquiring firms one fiscal year after the takeover announcement while the independent variable is the cash flow ratio one fiscal year prior to the acquisition. The constant term in the regressions signifies the abnormal cash flow return for acquirers after acquisition transaction. The sample is classified by social connection into subsamples of connected and non-connected deals. Robust t-statistics are reported in brackets. ***, ** and * represent statistical significance at the 1%-, 5%- and 10%-level, respectively.

Post-acquisition CF performance post 1 year	**Panel A Full sample**		**Panel B Full-service advisors**		**Panel C Boutique advisors**	
	Connected	**Non-connected**	**Connected**	**Non-connected**	**Connected**	**Non-connected**
Constant	0.0034	-0.0072**	-0.0144***	-0.0098***	0.0125***	0.0026***
	(0.64)	(-2.26)	(-5.59)	(-8.26)	(9.14)	(2.95)
Pre-acquisition CF performance pre 1 year	1.0803***	0.8208***	1.3518***	0.7589***	0.9376***	1.2988***
	(8.40)	(10.84)	(3.50)	(7.69)	(8.69)	(12.89)
Observations	100	1463	41	897	59	566
Adjusted R2	0.750	0.678	0.769	0.717	0.799	0.692

4.7 Appendix A

Variables	Definitions	Source
	Panel A: Dependent Variables	
Acquisition Premium	Acquisition premium in public deals is measured as the log percentage difference between offer price and target stock price 4 weeks before the takeover announcement. The premium for private deals is computed by multiplying the average premium for a comparable portfolio by one plus the acquisition discount (Officer, 2007).	CRSP/ Thomson One
Cumulative abnormal return for acquirers ACAR (-2,+2)	Following Brown and Warner (1985), the acquirers' cumulative abnormal return is calculated based on the market model with a five-days event window and estimation period starting 365 days and ending 4 weeks before the M&A deal announcement. As a benchmark, we use the value-weighted CRSP index.	CRSP
Cumulative abnormal return for targets TCAR (-2,+2)	Following Brown and Warner (1985), the targets' cumulative abnormal return is computed based on the market model with a five-day event window and an estimation period starting 365 days and ending 4 weeks before the M&A deal announcement. As a benchmark, we use the value-weighted CRSP index.	CRSP
Cumulative abnormal return of combined entity of acquirers and targets CCAR (-2,+2)	Market value-weighted cumulative abnormal return for the combination of acquirer and target's cumulative abnormal returns. The respective weights are computed using the market capitalisation of the respective companies 4 weeks before the M&A deal announcement.	CRSP
Buy-and-hold abnormal return (BHAR)	BHAR is computed as the difference between the buy-and-hold return of acquirers and buy-and-hold return of reference portfolios. Following Bouwman et al. (2007), 50 reference portfolios are identified for acquiring firms, classified by market valuation and Tobin's Q ratio. Then the buy-and-hold return of reference portfolios is calculated by compounding the average return of each portfolio for the event period.	CRSP
Industry-adjusted Return on Assets (IAROA)	The ROA for each acquirer, computed as the net income divided by the book value of the assets, deducts the median ROA of the bidder's industry with the identical first two-digit SIC codes.	COMPUSTAT
Industry-adjusted cash flow ratio	Following Gao (2011), the cash flow ratio is the acquirers' operating cash flow divided by its total assets. The industry-adjusted cash flow ratio is computed by subtracting the median cash flow ratio of sample firms (excluding acquiring firm itself) who are in the same industry and in the same decile of excess cash reserve ratio with acquirers.	COMPUSTAT
	Panel B: Key independent variables	
First-degree connection	Dummy variable that equals 1 if a director (including CEO) serves on the acquirer and target's board at the deal announcement.	BoardEx
Second-degree connection	Dummy variable that equals 1 if a social tie between the respective CEOs or directors of merging companies is present at the deal announcement.	BoardEx

Panel C: Advisor characteristics		
Boutique advisor	Boutique advisors are non-full-service advisors, providing specialised services in certain industries (such as technology, healthcare, etc.) or corporate finance (such as mergers and acquisition, restructuring, etc.)	Official Website
Global boutique advisor	Global boutique investments are boutique banks that provide international financial services.	Official Website
Domestic boutique advisor	Domestic boutique investments are boutique banks that focus on US and regional markets.	Official Website
Full-service advisor	Full-service advisor refers to investment bankers who engage in full-line financial services including trading, underwriting, M&A advisory, security and debt services etc.	Official Website
Reputation	The financial advisors rank (top-25) comes from the Thomson One database, ranked by the total deal value advised over the period from 2005 to 2016. Following Golubov et al. (2012), the top 8 advisors are defined as top-tier.	Official Website
M&A advisor	M&A advisors are boutique banks who point out M&A expertise in services description in their official web.	
Panel D: Firm characteristics		
Tobin's Q	Following Lang et al. (1989), Tobin's Q is computed as the ratio of market value by book value of the company's assets.	COMPU-STAT
Market Value (MV)	The market value is computed as the number of shares outstanding multiplied by the respective stock price at 4 weeks before the official deal announcement.	CRSP
Leverage	Leverage ratio is a ratio of total debt divided by total assets.	COMPU-STAT
Return on Equity (ROE)	Following Barber, Palmer, and Wallace (1995), the return on equity is calculated as a ratio of net income before extraordinary item and discontinued operations divided by the common equity and preferred equity of firms.	COMPU-STAT
Panel E: Deal characteristics		
Transaction value ($millions)	This variable accounts for the total value of consideration paid by the acquirer, excluding expenses and fees, in order to obtain the target. The total dollar value in millions is reported.	Thomson One
Relative deal size	Relative deal size is computed as the transaction value divided by the market capitalisation of the acquirer, 4 weeks before the official deal announcement.	Thomson One
Hostile takeover	Dummy variable that equals 1 if the M&A deal is reported as hostile.	Thomson One
Diversification	Dummy variable that equals 1 if acquirers' first two digits of SIC code are not the same as the targets' first two digits of SIC code.	Thomson One
Toehold	Dummy variable that equals 1 if acquirers own portion of target shares prior to the takeover announcement.	Thomson One
Competing bid	Dummy variable that equals 1 if the takeover deal is involved with more than one bidding firm.	Thomson One
Pure cash deal (Cash)	Dummy variable that equals 1 if the M&A deal is paid entirely using cash.	Thomson One
Pure stock deal (Stock)	Dummy variable that equals 1 if the M&A deal is paid entirely using stocks.	Thomson One

Advisory fee (Total $millions)	Advisory fee is the total amount of fees acquirers paid to M&A advisors upon the successful completion of takeover transactions, which is expressed as dollar value in millions.	Thomson One
Advisory fee (% Deal value)	Advisory fee (% Deal value) is the total advisory fees to M&A advisors expressed as a percentage of the transaction value.	Thomson One
Time to resolution	The days between the reported announcement of the deal and the effective date when the deal takes place.	Thomson One

Chapter 5: Conclusion

5.1 Summary

This thesis develops a composite benchmark for M&A and further investigates the impact of social connections on acquisition performance. The majority of M&A studies have addressed takeover outcomes and confined the determinants to deal characteristics and the firm characteristics of the acquisition partners. This thesis extends the previous M&A studies and provides a new perspective to review takeover outcomes and their determinants. Specifically, Chapter 2 creates a composite index (M&A index) to measure takeover efficiency and evaluate deal quality from a more comprehensive perspective. The M&A index captures pre-takeover firm information and deal characteristics and provides an effective and forward-looking indicator for acquisition performance. In addition, the rest of this thesis combines M&A studies with social network theory. Chapter 3 investigates social connections between acquirers and targets and their effect on acquisition premiums. Chapter 4 sheds light on board connections between acquirers and their M&A advisors and examines the impact of firm-banking connection on deals advised by full-service investment banks and transactions with boutique M&A advisors, respectively.

Recently, composite indexes have been increasingly recognised and developed in areas of corporate finance, such as the KZ index (Kaplan & Zingales, 1997) to measures financial constraint; and the entrenchment index (Bebchuk et al., 2009) and governance index (Gompers et al., 2003) to measures corporate governance. The composite index is superior for simplifying complex processes, quantifying abstract

topics and facilitating comparison between different samples (Sharpe, 2004). However, a composite indicator is absent from the existing literature. Moreover, previous M&A studies have generally focused on partial merger outcomes and lack any overall evaluation of takeover activities. Chapter 2 fills this gap and aims to create a composite benchmark (M&A index) to measure takeover efficiency and effectively forecast post-acquisition performance.

In Chapter 2, a deal is defined as being efficient if and only if the takeover bid maximises the acquirers' announcement return when announced to the public. The M&A index scores the efficiency degree of each takeover deal and ranges from zero to one. The transaction with a higher index implies that the deal is more efficient and expected to have a better acquisition performance. The M&A index is constructed using the stochastic frontier analysis (SFA) approach. Due to the limitations of SFA, the sample selected in Chapter 2 is restricted to the deals in which acquirers have positive return on announcement day. Essentially, the M&A index is the technical efficiency of the SFA models and calculated as the ratio of actual acquirers' announcement return over the optimal and maximum return level. The higher efficiency implies that observed acquirer gain is closer to the optimal acquirer return at the time of takeover announcement. Acquirers' announcement return reflects the market response and expectations regarding a takeover bid and is adopted as the output in the SFA model. The inputs for the M&A index include pre-takeover deal characteristics and firm information of merger parties. Then, Chapter 2 examines the relationship between the M&A index and takeover outcomes. The empirical evidence shows that deals with a higher M&A index are significantly and positively associated with probability of deal completion, acquirers' announcement return and buy-and-hold return in the long run, as well as industry-adjusted return on assets

over the post-acquisition period, indicating that more efficient deals are more likely to succeed and achieve better short-run stock performance and post-acquisition performance in the long run. Furthermore, the research builds a buy-and-hold strategy and forms three portfolios based on the level of M&A index. The results indicate that the portfolio with the highest indices – and the most efficient deals – consistently outperform the portfolio with the lowest indices – and least efficient deals – when holding acquirers' stocks over the post-acquisition period. On average, the portfolio with the most efficient deals earns a 7% higher monthly return than the portfolio with the least efficient deals for 1 month to 6 months following takeover announcement. Overall, the M&A index, as a measurement of takeover efficiency, can be used to forecast acquisition performance in both the long and short run due to the strong and positive relationship with takeover outcomes.

Next, the thesis explores the impact of social connections on mergers and acquisitions. A few previous studies have investigated social connections between acquirers and targets and found mixed results on the relationship between acquirer-target connection and acquisition performance. Chapter 3 extends the previous studies and provides further evidence of the effect of social connection. Specifically, social connection is defined as the personal network of board director and executives, including first-degree connection[31] and second-degree connection[32]. Specifically, Chapter 3 focuses on premium analysis, which is directly affected by social connections and best reflects the negotiation power between connected acquirers and targets. Moreover, the research includes the target 52-week high

[31] First-degree connection in Chapter 3 refers to the situation where acquirers and targets share the same board members or executives.

[32] Second-degree connection in Chapter 3 is defined as connected directors, respectively from acquirers and targets, being linked through the same past experience, such as employment history, educational background and government or club experience.

(Baker et al., 2012), which is a psychological reference point for both acquirers and targets to value target firms and decide acquisition premiums. Consequently, social connections between acquirers and targets, especially first-degree connections, significantly reduce the acquisition premium paid for targets, even when the target 52-week high reference point is controlled. The findings imply that social connection outweighs the psychological reference point and plays a determining role in acquisition premiums. Acquirer-target connection reduces information asymmetry, facilitates information exchange and increases acquirers' bargaining power in terms of pricing the target company and the negotiation process. Furthermore, this thesis analyses why social connection favours acquiring firms and why connected target firms are willing to accept less favourable deal outcomes. The findings can be explained by the positions of the connected directors or executives in the acquirer and target firms.

When acquirers and targets share the same board member (first-degree connection), the interlocking directors or executives tend to remain on the board of the newly merged firms. In 90.25% of first-degree connected deals, overlapping directors had higher or equivalent levels of position in the acquirer firm. In second-degree connected deals, connected directors are generally recruited as independent directors in target firms and most likely offered a board seat on the newly merged firms by the acquirers. In addition, acquiring firms tend to be larger in size than target firms. According to Ferris et al. (2003), larger firms offer more opportunities for directors. Being retained on the board of newly merged firms certifies directors' ability and gives directors both financial and non-financial benefits. Therefore, connected target directors have an incentive to promote deal completion and accept inferior deal items, leading to deviation from the interests of target shareholders.

Furthermore, Chapter 4 analyses social connections between acquiring firms and their M&A advisors. Previous studies illustrate that social connections with financial firms positively affect firm performance and investment decisions through information advantage. Yet, the connection between bidders and investment banks has not been explored in the literature. Chapter 4 fills this gap and sheds light on acquirer-banking connections through individual networks. In addition, this research classifies M&A advisors into full-service investment banks and boutique investment banks. In recent years, boutique advisors have attracted considerable firm clients and grabbed a large share of the market from full-service banks. However, few M&A studies have devoted significant attention to the study of boutique investment banks. Complementary to previous studies, Chapter 4 examines the effect of firm-banking connection in deals advised by either full-service investment banks or boutique advisors. Similar to Chapter 3, social connection refers to board connections through personal networks and includes both first-degree connections[33] and second-degree connections[34]. As a consequence, social connections with full-service banks show completely different effects from connections with boutique advisors. The opposite connection effects are attributed to the essential difference between full-service investment banks and boutique investment banks.

Due to the fierce competition in the investment banking industry, financial advisors have a strong incentive to build and maintain firm-banking relationships in order to get business, including profitable M&A business (Anand & Galetovic, 2006). Unlike full-service banks, boutique advisors are generally small, relatively unknown and

[33] First-degree connections in Chapter 4 refers to the situation where acquirers and M&A advisors share the same board members.

[34] Second-degree connections in Chapter 4 are defined as two individual directors, respectively from the acquirer and target firm, serving on the board of a third firm.

specialise in corporate finance services (e.g. M&A, restructuring, etc.) or certain industries (e.g. technology, healthcare, media, etc.). The majority of boutique investment banks are at a distinct disadvantage in terms of their popularity, information and network, and unable to afford large marketing and advertising costs like larger players, especially for domestic boutique advisors who focus on US and regional markets. Therefore, domestic boutique investment banks rely more on the social connections through personal networks to pursue M&A business. Moreover, boutique advisors, especially domestic ones, tend to serve the interests of firm clients in order to maintain long-run connections for future financial services business. In addition, acquiring firms may choose connected boutique banks as their M&A advisors due to a sense of trust and familiarity. By contrast, connected full-service investment banks tend to know both the acquirers and the targets. Despite being the bidders' M&A advisors, full-service banks may not only consider the interests of the acquiring firms. Another case is that investment bankers may help targets to initiate acquisition attempts and search for acquirer candidates. Due to familiarity bias, investment banks may give priority to connected firms. Additionally, connections with full-service investment banks may lead to the "lock-in" problem where firms may retain inferior financial advisors instead of trying to find new investment banks. Hence, full-service investment banks that are socially tied to acquirers may act against the interest of acquiring firms, resulting in unfavourable deal outcomes.

As a result, Chapter 4 observes that the acquirer-advisor connection significantly increases the likelihood of boutique investment banks being chosen. In particular, when acquirers share overlapping directors with domestic boutique advisors, the probability of domestic boutique banks being selected is 4.87 times greater than the probability of not being chosen. These findings suggest that first-degree connections

help boutique advisors to obtain business, and acquirers are willing to appoint connected boutique banks as M&A advisors, and especially domestic boutique investment banks. However, social connection with full-service banks is significantly and negatively associated with the probability of being chosen, indicating that acquirers are less likely to hire full-service investment banks who are socially linked with them. This negative relationship can be explained by the fact that connected directors are generally recruited as independent directors in acquirers and/or full-service banks. Additionally, acquiring firms may recognise the potential agency conflicts with connected full-service advisors. Furthermore, Chapter 4 examines the impact of acquirer-advisor connection in acquisition premium and acquisition performance in deals advised by full-service banks and boutique advisors, respectively. Consequently, acquirers pay a significantly lower premium in deals in which acquirers and boutique advisors have first-degree connections while social connections with full-service investment banks are associated with a higher acquisition premium paid to target firms.

In addition, acquirers' announcement returns are not affected by the acquirer-advisor connection regardless of types of investment banks. This is because the market does not recognise firm-banking connections, thus it is not reflected in acquirers' stock movements. However, connections with full-service advisors improve the announcement return of targets and the combined entities, implying that connected full-service banks do not act in the interest of acquirers. In the long run, acquirers who are closely connected with boutique advisors earn higher buy-and-hold return, higher industry-adjusted return on assets and higher cash flow return than acquirers without connections in the fiscal year following takeover announcement. Acquiring firms who hire connected full-service banks underperform non-connected acquirers

in terms of post-acquisition stock performance and operating performance. In a nutshell, the empirical results show that boutique advisors serve the interests of connected acquirers and deliver better deals for their clients, while acquiring firms suffer more agency conflicts in deals advised by connected full-service banks and achieve inferior deal outcomes.

Overall, this thesis provides a new perspective to review acquisitions and their determinants. The findings show that the M&A index is an effective and forward-looking index to evaluate deal quality. In addition, takeover outcomes are affected by the social network between acquisition partners or between acquirer and M&A advisors.

5.2 Implications

The implications of this thesis are profound for both academic researchers and practitioners. Chapter 2 constructs a composite benchmark – the M&A index – for takeover efficiency. Due to the strong relationship with merger outcomes, the M&A index provides an effective measurement to evaluate overall deal quality and forecast post-acquisition performance. Similar to the KZ index for financial constraints or the entrenchment index for corporate governance, the M&A index could be included or controlled as a variable in the models to gauge the impact of M&A in research on asset pricing or corporate finance as acquisitions have a profound influence on firm performance and corporate decisions. Additionally, the M&A index can also be used to measure market response to takeover announcements. Complementary to the existing literature, Chapter 2 provides a new perspective to quantify and simplify abstract and complex issues in corporate finance. For practitioners, investors and arbitrageurs could develop trading strategies based on the M&A index. Shareholders

of merger parties could find out whether or not acquisition attempts maximise the interests of shareholders, therefore improving monitoring and reducing agency problems. Acquirers' management could learn from the M&A indices of previous takeover deals and reduce the inefficiency factors to achieve a better performance for acquisitions in the future.

Next, Chapter 3 examines social connections between acquirers and targets. Previous studies have found mixed results regarding the effects of acquirer-target connections. Chapter 3 provides further evidence through premium analysis and confirms the presence of information advantage in connected deals. However, the findings imply that social connections between merger parties only favour acquiring firms. Connected directors in targets are motivated by self-interest to accept less favourable deal items and promote completion. Therefore, acquirers who initiate acquisition attempts could consider connected firms as target candidates since inter-firm connections increase acquirers' bargaining power and results in better deal terms. Moreover, Chapter 3 illustrates that for acquisition partners, the effect of information outweighs the influence of the psychological reference point in determining acquisition premiums. Therefore, acquirers could enhance their information advantage for lower premiums by hiring targets' previous advisors or finding out third-party firms that are linked to both the acquirer and the target. For target firms, shareholders should take extra care regarding takeover bids from connected acquirers and agency conflicts with management and directors.

Finally, Chapter 4 explores the social connections between acquirers and their M&A advisors in deals advised by full-service investment banks and transactions with boutique investment banks, respectively. It indicates that social connections with

boutique advisors, especially domestic boutique advisors, benefit acquirers by negotiating lower acquisition premiums and delivering better deals while social connections with full-service banks have a negative impact on the acquisition performance of acquiring firms. The results imply that connected boutique advisors serve the interests of their "friends" (bidding firms) while full-service investment banks act against the interest of connected acquirers and result in more agency conflicts. Therefore, connections with boutique advisors are valuable for acquirers. In the advisor-selection process, acquirers could rely on their personal network to hire closely related boutique banks as their advisors while boutique advisors could try to market themselves through their managers' and directors' network. In contrast, hiring connected full-service advisors is not recommended. Furthermore, the effect of social connection depends on the types of firm involved. Therefore, future studies on social network may wish to classify connected firms based on firm characteristics.

5.3 Limitations and future research

This thesis has some limitations that can be explored in further research. First, Chapter 2 constructs the M&A index using the stochastic frontier analysis (SFA) approach, which requires the output (in this case, acquirers' announcement returns) for SFA models to be positive. To meet the restrictions, the research only considers deals with positive returns for acquiring firms on the announcement day. Moreover, the sample for the M&A index is limited to public deals in which both the acquirers and targets are public firms in order to incorporate firm and deal characteristics as comprehensively as possible. Therefore, future research could relax the conditions for the M&A index and adjust or change the SFA models to include more takeover

samples and expand the application of the index. Moreover, Chapter 2 sheds light on the inefficiency component in takeover transactions, for example corporate governance. Yet, due to data availability restrictions, the research only studies a sample from 1990 to 2006 and lacks recent data. Future research could address the inefficiency in M&A transactions by improving data availability or finding replacements for variables with many missing values.

Second, Chapter 3 focuses on the effect of social connections between acquirers and targets on acquisition premium and supports the information-advantage theory. Social connections in Chapter 3 refer to personal connections of board directors and executives. Future research could adopt various indicators for social connection. For example, the degree of social connection could be measured with the percentage of connected directors, computed as the number of connected directors divided by the number of board members. Moreover, the research could include investment banks connections too and examine whether connected merger parties hire investment banks, what types of investment banks (full-service banks versus boutique banks; top-tier investment banks versus non-top-tier) are involved in the connected deals, and whether connected acquirers and targets hire the same investment banks.

Third, Chapter 4 sheds light on the connection between acquirers and their M&A advisors through board members' personal networks over the sample period from 2005 to 2016. The future study could expand the sample period, for example, from 2000 to 2016 to include more deals. In addition, the research could be extended by examining the connections between targets and M&A advisors or between acquirers, targets and M&A advisors.

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